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THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

66 PORTLAND PLACE LONDON W1 · TWO SHILLINGS AND SIXPENCE

Château Grimaldi, the old town, Cagnes. From a drawing by Alan D. Coward [F]

ELKINGTON "GATIC"

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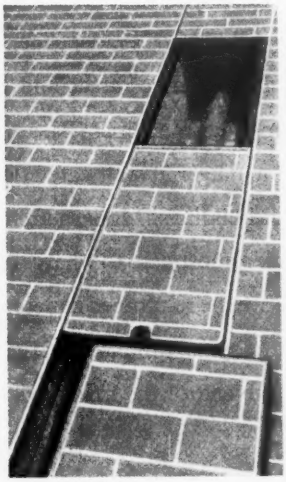
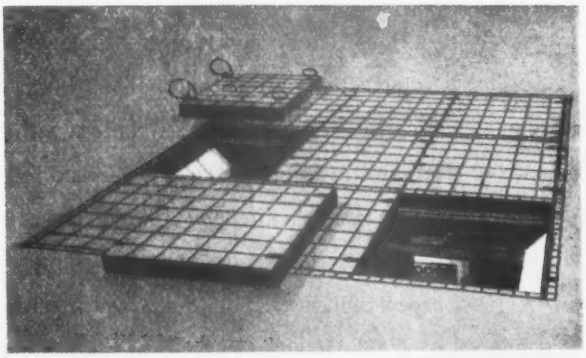
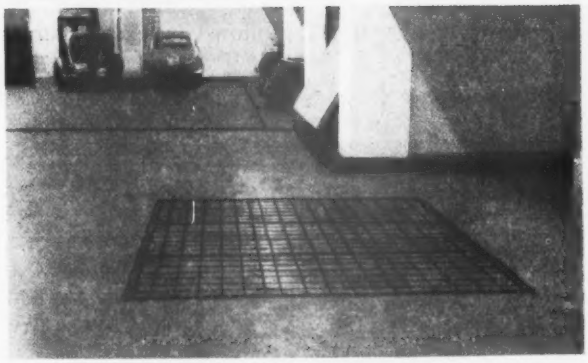
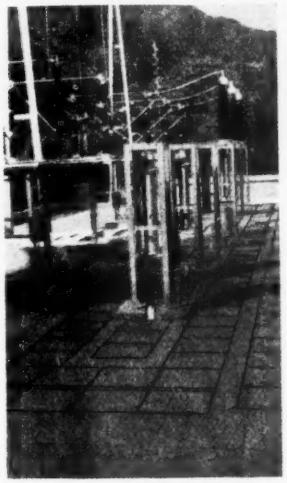
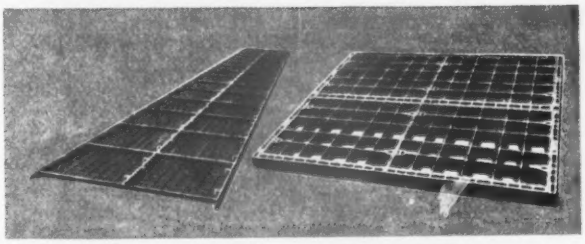


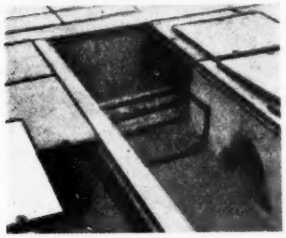


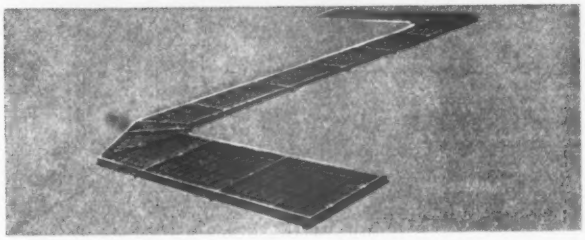




The versatility of the "Elkington-Gatic" design of cover is clearly illustrated from the number of applications shown here. Whilst the origin of the "Elkington-Gatic" cover is British, the same degree of standard is to be had in many overseas countries from our Licencees. These illustrations are the contribution of the Swiss Licencees, Louis de Roll, Delemont.







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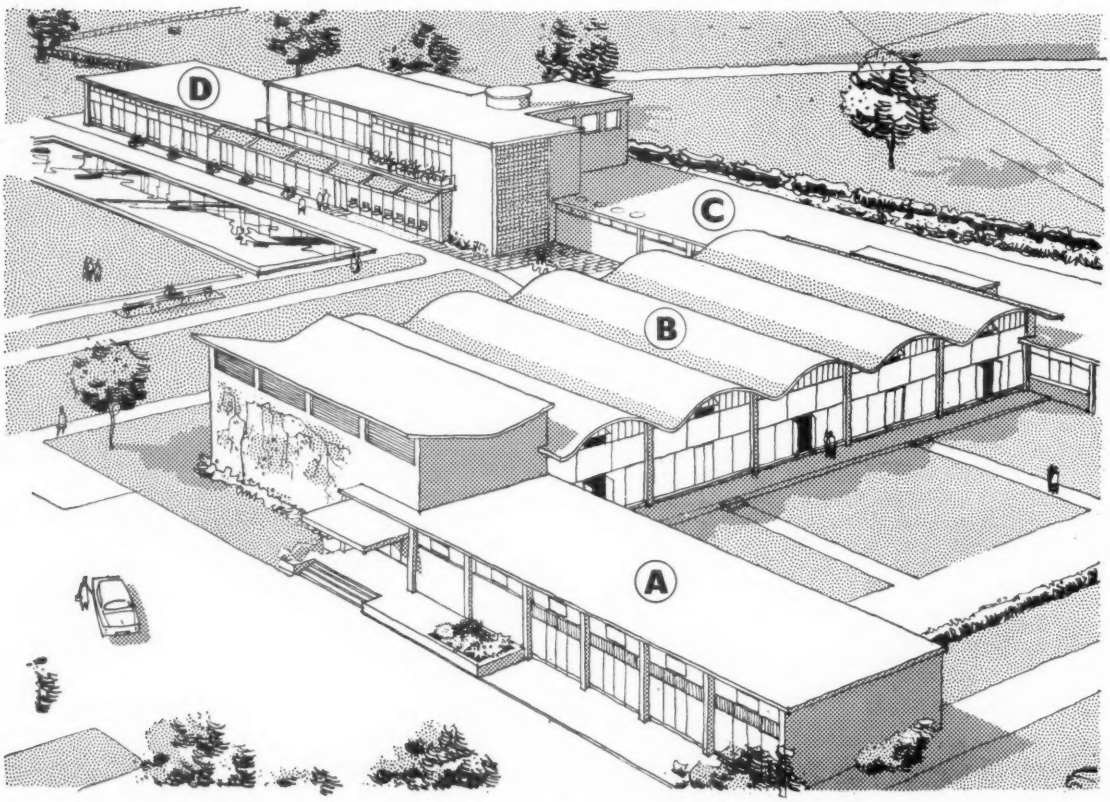
NEW DESIGNS FOR WORKING No 4 . . . .

This factory recreation and canteen group is built as an independent unit, separated from the operational parts of the works by lawns, games areas and gardens.
It consists of an employees' canteen with ample stage facilities (B), adjoining the small administration block (A), and linked to the managerial staff cafeteria and recreation centre (D) by a kitchen (C) which serves both buildings. Modern architectural idioms have been used to give a pleasant country-club atmosphere to what is often a neglected aspect of industrial building. Typical of these are the reinforced concrete barrel-vaulted roof, riding lightly on the glass walls of the employees' canteen, and the ground-to-roof "INSULIGHT" Hollow Glass Block panel at the end of the managerial staff cafeteria.

Designed by Edward D. Mills, F.R.I.B.A.



A Administration block
B Employees' canteen
C Kitchen
D Managerial staff cafeteria

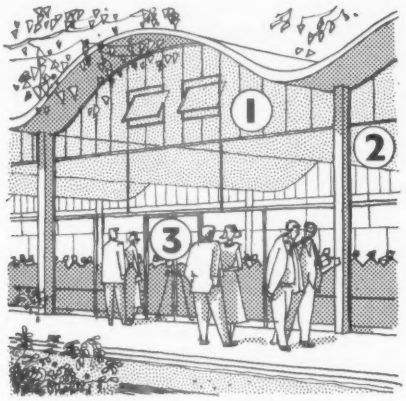
. . WORKS RECREATION CENTRE & CANTEEN

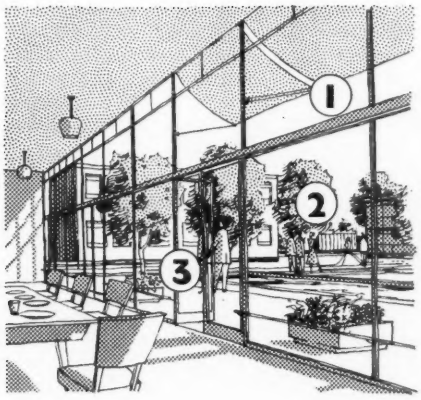
EMPLOYEES' CANTEEN (B)

1 32 oz. S.Q. Sheet glass

2 ¼" Polished Plate glass for transoms and side panels

3 Metal doors glazed with "ARMOURPLATE" glass





MANAGERIAL STAFF CAFETERIA INTERIOR (D)

1 "ANTISUN" glass

2 ¼" Polished Plate glass side panels

3 Metal doors glazed with "ARMOURPLATE" glass

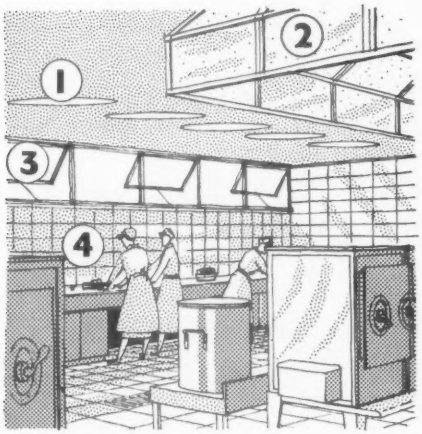
KITCHEN INTERIOR (C)

1 Spherical Wired Cast Domes

2 ¼" Georgian Wired Cast glass fume hood

3 32 oz. Sheet glass

4 "VITROLITE" wall lining



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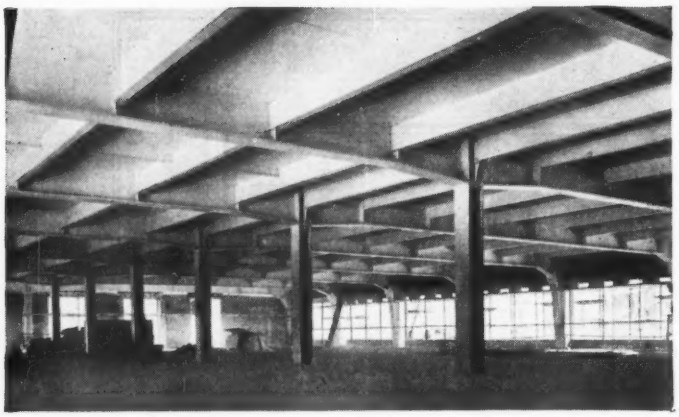

Illustrated are examples of welded construction comprising portal frames and stanchions, a 56″ diameter pipeline with spun concrete lining and a road bridge at Clayhithe in the County of Essex.

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PERFORATED

BRICKS

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ACCRINGTON 'NORI'

wirecut bricks, to the specification of the Architect. The exceptional properties of the material used for 'Nori' bricks ensure adequate strength even when perforated. Production of these bricks will shortly be resumed and enquiries are invited.

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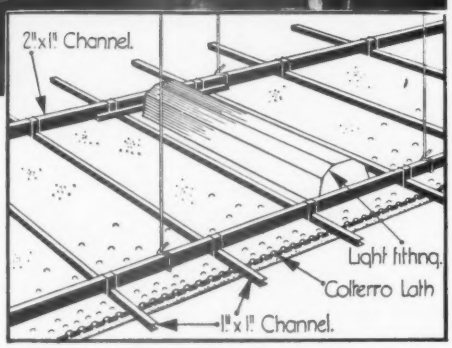
ARCHITECT: *C. G. Stillman,* F.R.I.B.A. *(Middlesex County Architect)*
GENERAL CONTRACTOR: *Prestige & Co. Ltd.*
PLASTERING CONTRACTOR: *S. Towers & Son, Ltd.*



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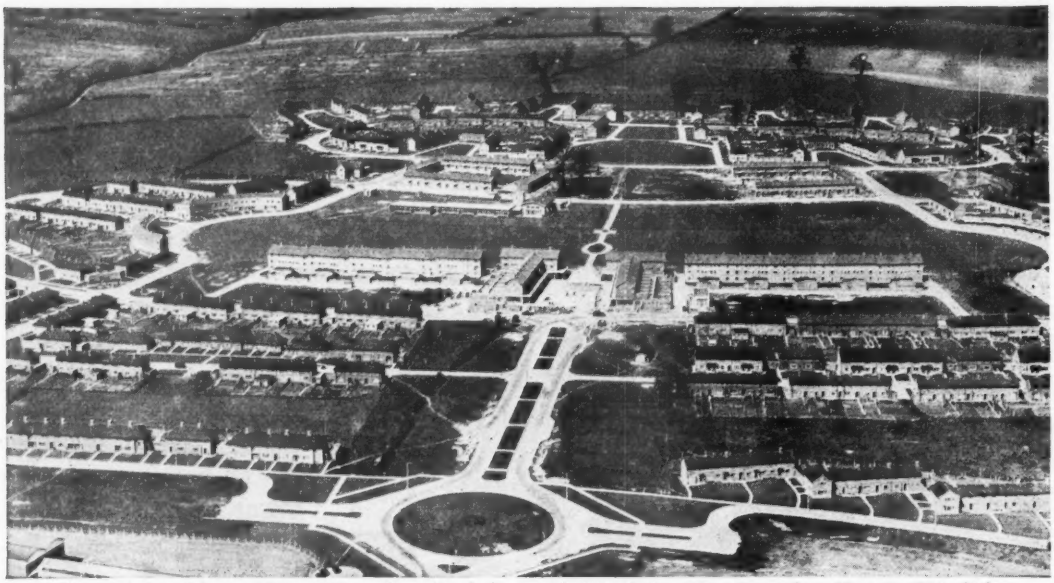
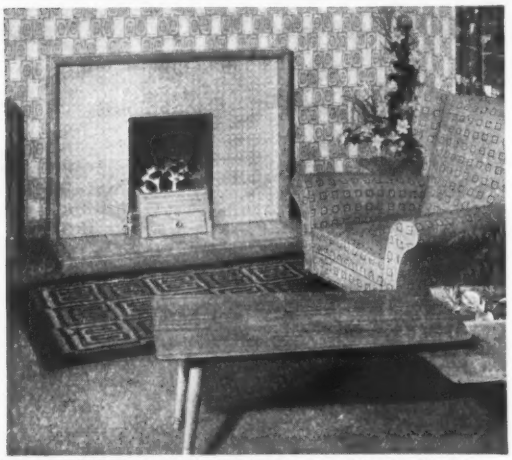
New housing calls for 'IDEAL' *warming*



An aerial view of the new Housing Estate, Kings Heath, for the County Borough of Northampton, designed by J. L. Womersley, A.R.I.B.A., A.M.T.P.I., formerly Borough Architect. Each of the 325 dwellings shown is fitted with an Ideal 'Neofire', one 8-section and one 10-section 24 in. high Ideal No. 2 Neo-Classic Radiator, and an Ideal No. "00C" Copper Indirect Cylinder. When completed the estate will have 432 houses similarly equipped.



The specially designed boiler incorporated in the Ideal Neofire enables this remarkable open fire to heat radiators in three other rooms, in addition to supplying hot water for baths and domestic use. Though primarily designed to burn coke, it will burn coal, anthracite or special fuels. The Ideal Neofire provides this complete house-comfort service for the consumption of approximately 2 lb. of fuel per hour, because it utilises up to 60 per cent of the heat contained in the fuel, whereas the ordinary open fire seldom produces benefit to the user of more than 15 to 20 per cent.

The Ideal Neofire was introduced to provide the perfect system of background heating for the small three-bedroom house. More than 150,000 are now installed in Britain.

Ideal Background Heating combines the advantages of circulated warmth, by means of hot water radiators, and the cheerful comfort of an open fire. The constant warmth is sufficient to keep the house free from draughts and damp, reducing the maintenance costs of decorations and furnishings.

Ample hot water for baths and domestic purposes is always available where Ideal Background Heating is installed. It is supplied through an indirect hot water cylinder which also serves to warm an airing cupboard, while preventing lime deposit in hard water districts and, consequently, saving the cost of periodical pipe renewals and boiler cleaning.

IDEAL NEOFIRE

A cheerful open fire which provides background heating in three other rooms, *and* supplies abundant hot water.

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There's a bragging headline if ever there was one. And yet it sums us up. In Britain you'll find Williams & Williams windows in hundreds of the new schools, in power stations and gasworks, in refineries and factories in towns old and new. But we also have 18 factories scattered around the world and agents in 46 countries—result—Williams & Williams metal windows in almost every civilised country in the world and a lot of the less civilised. What use is all this to you, did you say? It simply means you can get first-class metal windows and on-the-spot service anywhere you like!

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** Enclosed metal head. Simple to install, simple to remove.* ** Automatic locking device. No wall cleats.*
** Exclusive 'S' shaped slat. Better diffusion of light. Better closure.* ** Slat piercings eyeletted. Cord wear eliminated.*
** Eleven attractive pastel shades, with matching or contrasting tapes and cords.*

Kirsch SUN-AIRE **THE ARISTOCRAT OF MODERN VENETIANS**

made to measure and installed by leading blind makers throughout the country. Also obtainable from principal furnishing stores. *For further information apply:*

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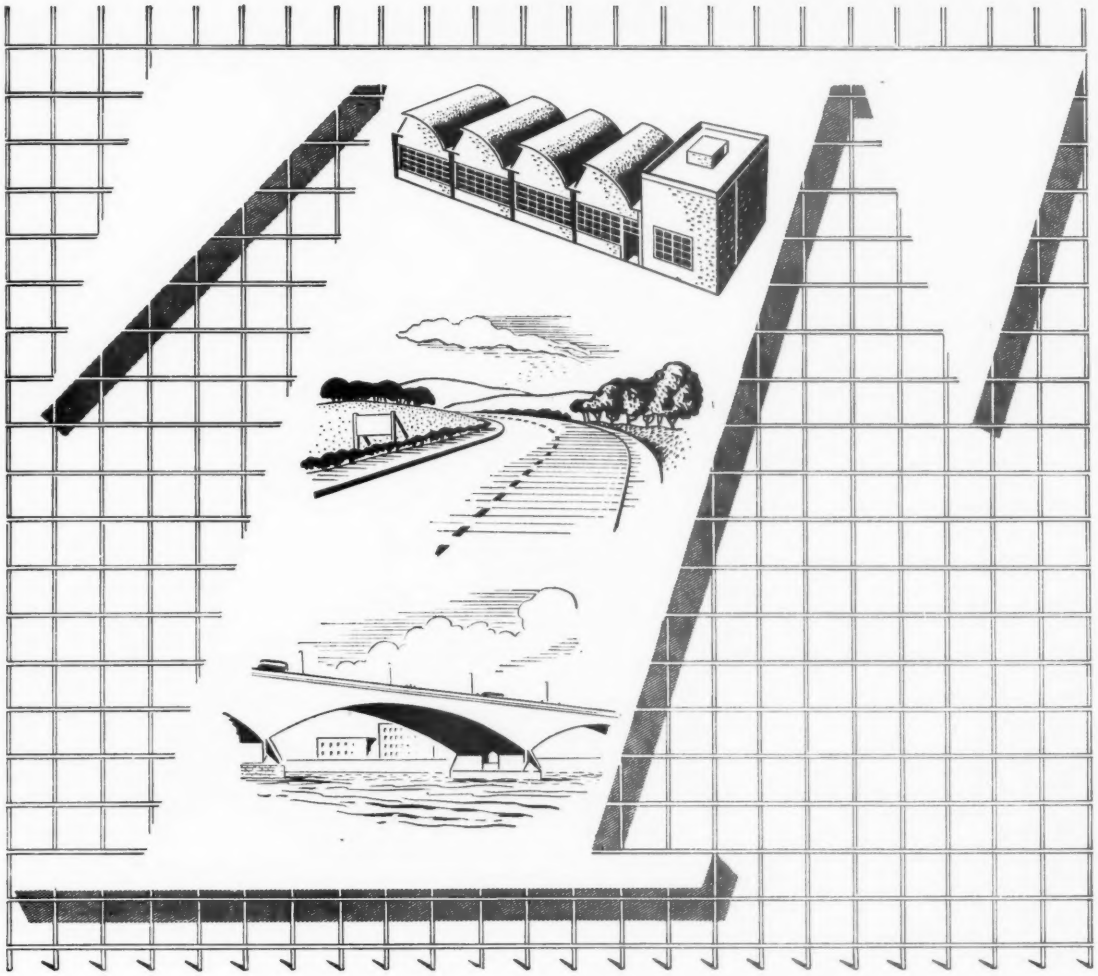

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In roads and bridges and buildings, in fact wherever concrete is used, Wireweld fabric reinforcement finds its place. Its strength and ease in handling means lower costs — and talking of costs — the aim of Twisteel's drawing offices is economy in the structural design of Factories, Schools, Flats, etc. Finer buildings at lower costs.

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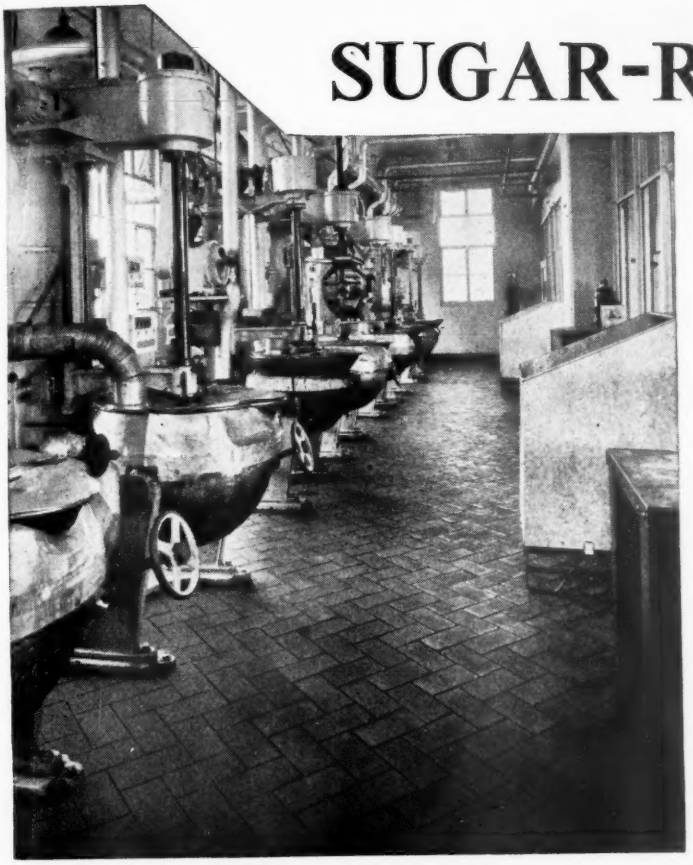

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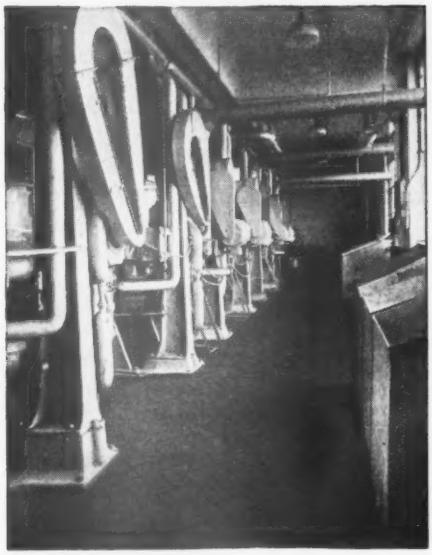
by

WHEATLY

Over 1,000 sq. yds. of Red Shot Faced 9″ x 4½″ x 1¼″ Triton Quarries laid in special acid-resisting cement were used in this factory.

Clarnico Ltd. Factory at Stratford, E.15
Consulting Engineers: Oscar Faber & Partners



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Specimens of Wheatly Tiling may be seen at the Building Centre, London. Wheatly products include Single-lap Roofing Tiles, Ridge Tiles (blue and red), Floor Quarries, Air Bricks and Briquette Fireplaces.

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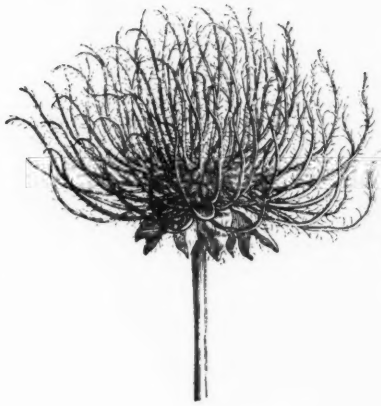
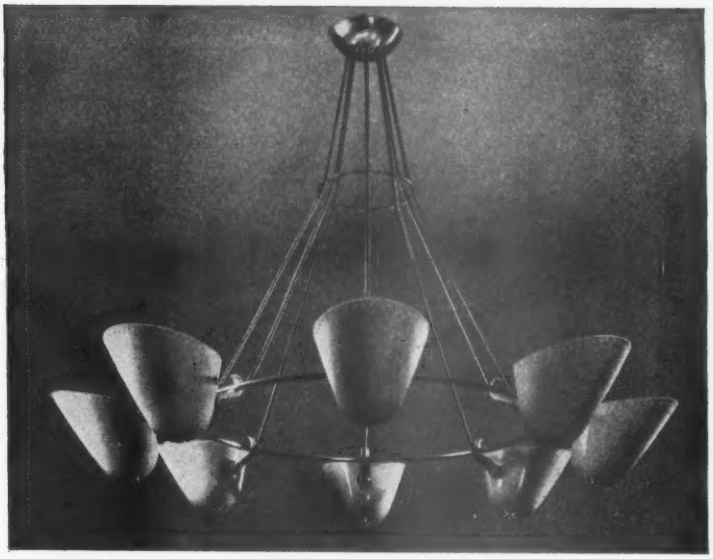
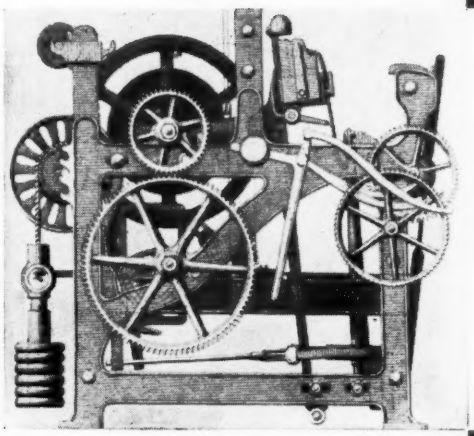
DESIGN



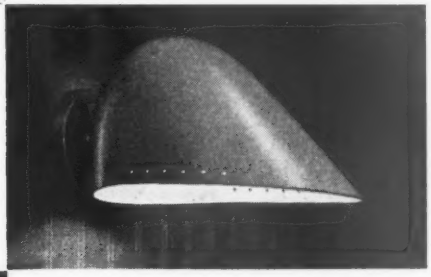


FV. 118/R

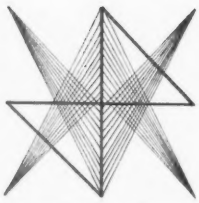


TROUGHTON & YOUNG

FV.3/R

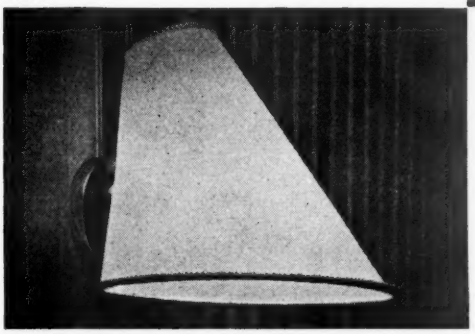


WORKMANSHIP



UNDERSTANDING

FV.3/S



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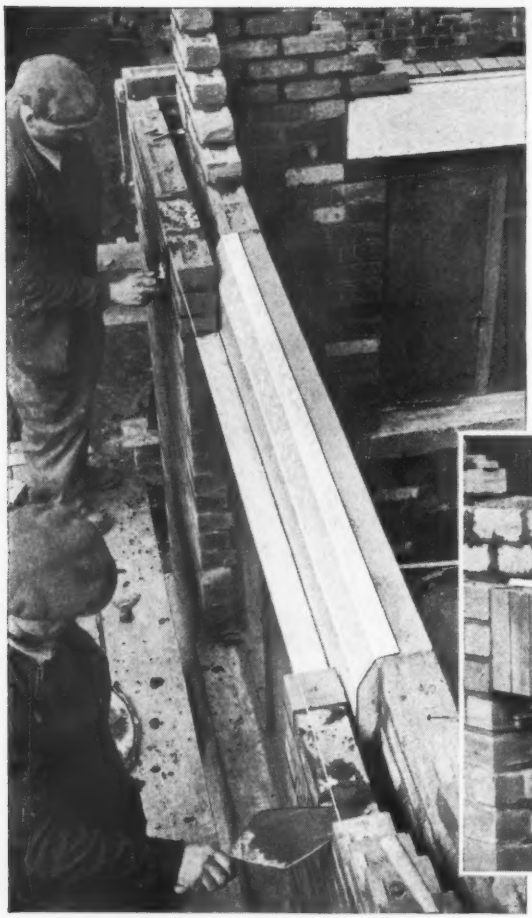
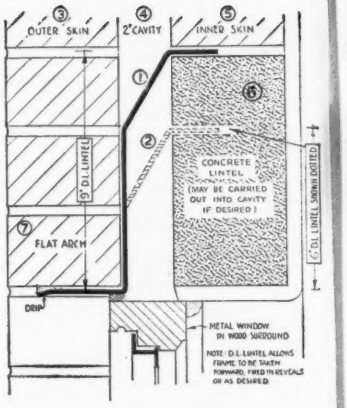


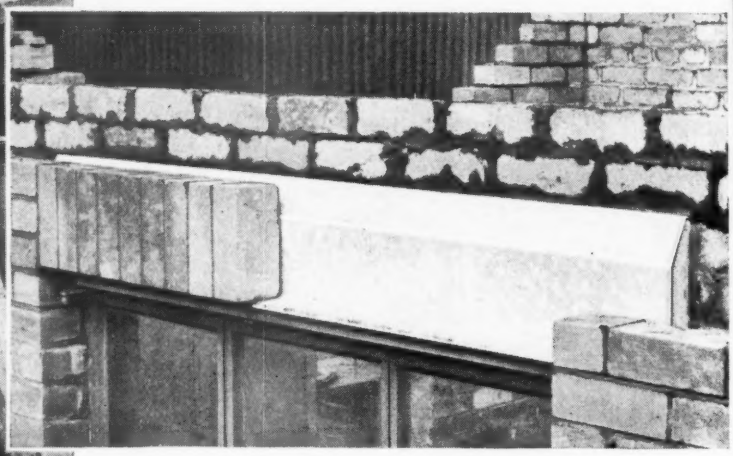
SECTION SHOWING TYPICAL DETAIL

(1) 9 in. Dorman Long Lintel
(2) 6 in. Dorman Long Lintel (shown dotted)
(3) Outer skin
(4) Cavity
(5) Inner skin
(6) Inside concrete lintel (carried out into cavity if so desired)
(7) Flat arch

The wide 'turn-in' of the Dorman Long Lintel allows the cavity to be varied from 2 in. to 2¾ in. in width.

Patent No. 694214





THE DORMAN LONG LINTEL

Combined Angle Arch Support & Dampcourse Tray

IN HOT-DIP GALVANIZED STEEL, FOR USE AT THE HEADS OF OPENINGS IN EXTERNAL CAVITY WALLS

Comes on site to required length ready to fix.
Large saving in site labour costs.
Cannot be damaged in cavity cleaning.

THE DORMAN LONG LINTEL has only to be placed into position over the head of the opening by the bricklayer, and without delay the work carries on.

Prices and details from:
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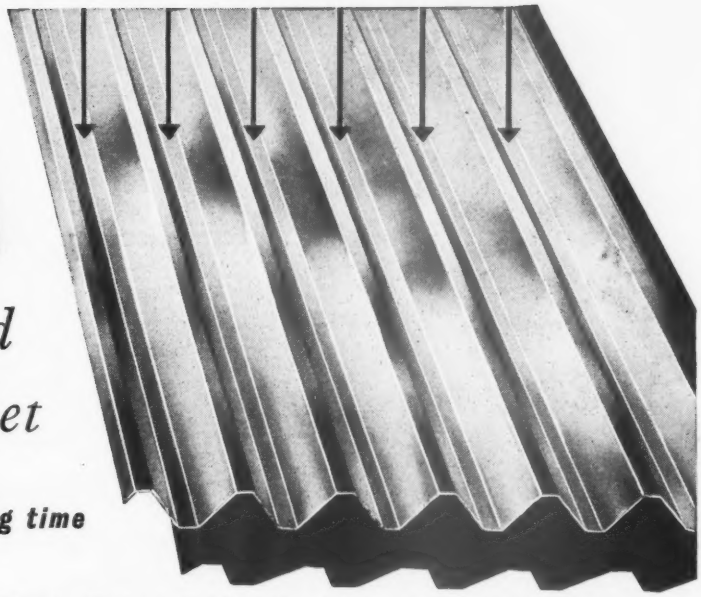
DORMAN LONG

NEW, WIDER, 6-TROUGH

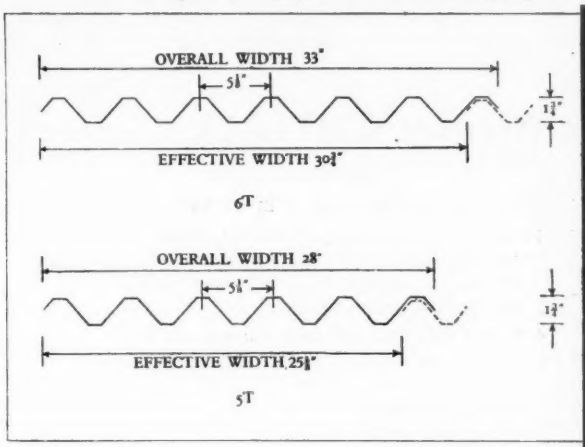
'Rigidal'

corrugated aluminium sheet



Saves handling, lapping and fixing time

In view of the success of 'Rigidal' 5T and 4T sheet, British Aluminium are now producing a 6T section which not only possesses all the features of the narrower sheets but also offers several additional advantages. Five inches greater in overall width than the 5T, the new 6T sheet saves 1 side lap in every 5, reduces handling, speeds fixing and affords greater cover per sheet.



Purlin spacings and recommended maximum design loads

Purlin Spacing	Design loads (lb./sq. ft.)	
	18 swg	19 swg
6′ 0″	87	71
6′ 6″	76	61
7′ 0″	64	52
7′ 6″	56	46
8′ 0″	49	40
8′ 6″	44	36
9′ 0″	40	32
9′ 6″	36	28
10′ 0″	32	25
10′ 6″	28	*

**Not recommended*

Notes 1. The above design loads are based on a maximum working stress of 11,000 lb./in.² giving a factor of safety of 2 on the 0.1% proof stress (yield).
2. The zigzag line indicates the maximum purlin spacings which may be employed when working to B.S. Code of Practice C.P.3., Ch. V Para. 7b. Use of purlin spacings below the line depends upon the pitch of the clad surface, the maximum spacings shown being those recommended for vertical walls.
3. The recommendations tabulated above are based on an assumed minimum roof pitch of 10°, with sheets fixed in accordance with recommended practice, including seam bolts at 18″ centres.

'Rigidal' sheet lights can be supplied to match Trough Section (5T) sheet.

THE BRITISH ALUMINIUM COMPANY LIMITED

NORFOLK HOUSE ST JAMES'S SQUARE LONDON SW1

A NEW VENETIAN BLIND—by CRITTALL

The new Crittall Venetian Blind is designed to leave the rudimentary principle of cord operation far behind—together with its snags and hazards. The Crittall 'Solomatic' provides what has been needed for so long as a complement to contemporary design—a means of excluding sun glare without excluding much light and slats which will not rot or reduce ventilation.

Crittall's long experience in windows has made the blind suitable for 'designing in' for neatness and efficiency so that it belongs to the window it embellishes—and is not just added afterwards. With suitable provision it can be fitted externally or out of vertical. If required, two or three adjacent blinds may be operated by one gear control. Full particulars will be sent on request to the nearest Crittall Branch.

Other outstanding points of interest are:

1 **NO CORDS TO DANGLE, TANGLE OR WEAR**

2 **ONE SINGLE CONTROL** (*Single strap, double strap or gear*) *tilts the slats as well as raising or lowering the blind.*

3 **UNEVEN LOWERING IMPOSSIBLE**

4 **ROBUST ALL-METAL MECHANISM** *assures long life.*

5 **MADE IN ALL SIZES** *up to 16′ 0″ wide and 20′ 0″ high. No loss of mechanical efficiency in the larger sizes.*

6 **SLATS** *Light aluminium slats with a plasticised enamel finish in the usual alternative shades.*

7 **LADDER TAPE** *A double-cross web prevents "flutter".*

EXTRAS

(*a*) *Continuous vertical guide channels prevent swaying.*

(*b*) *Pressed steel cover-plates (pelmets) lend a finished appearance to the raised blind.* Note—*Both are stove enamelled to match the slats.*

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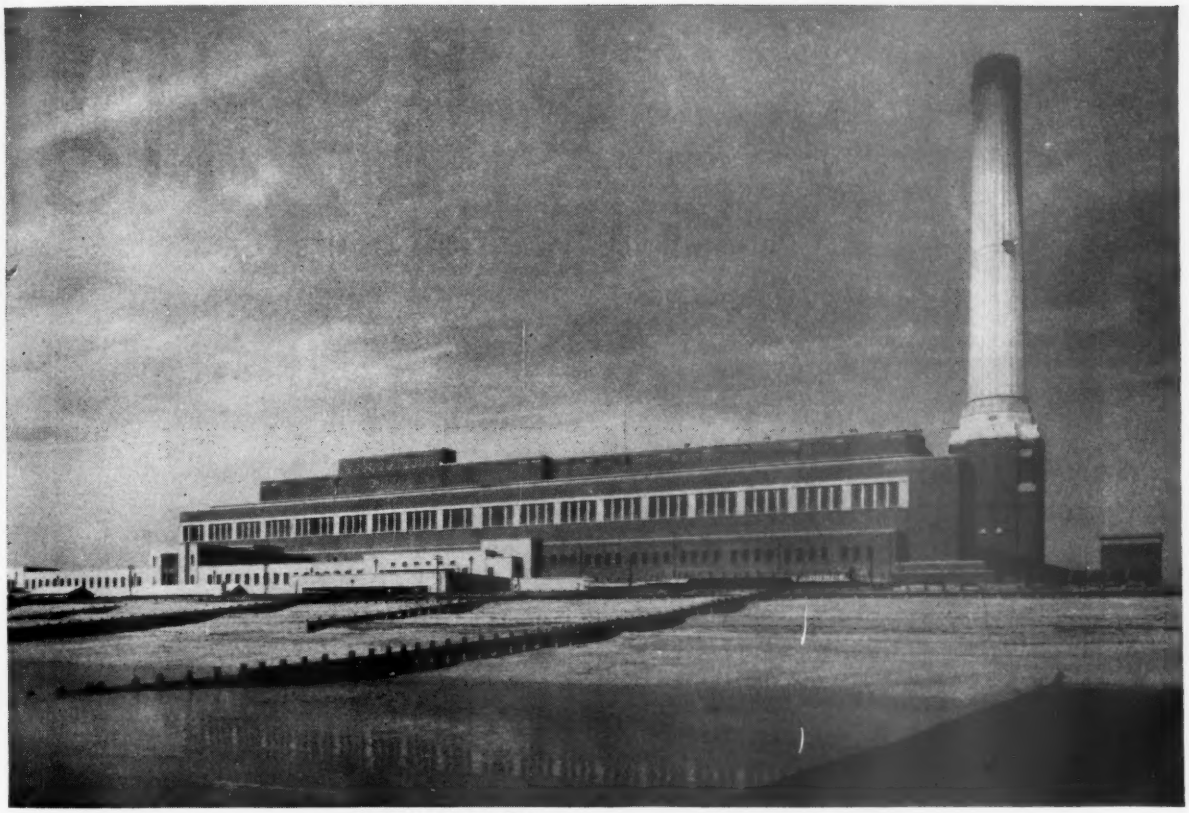

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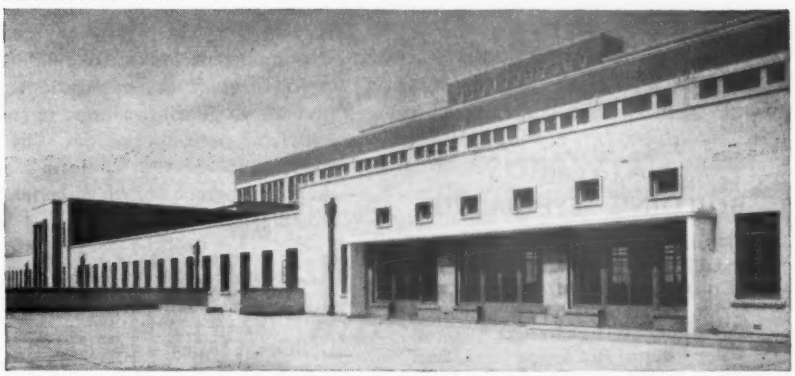
BRIGHTON POWER STATION



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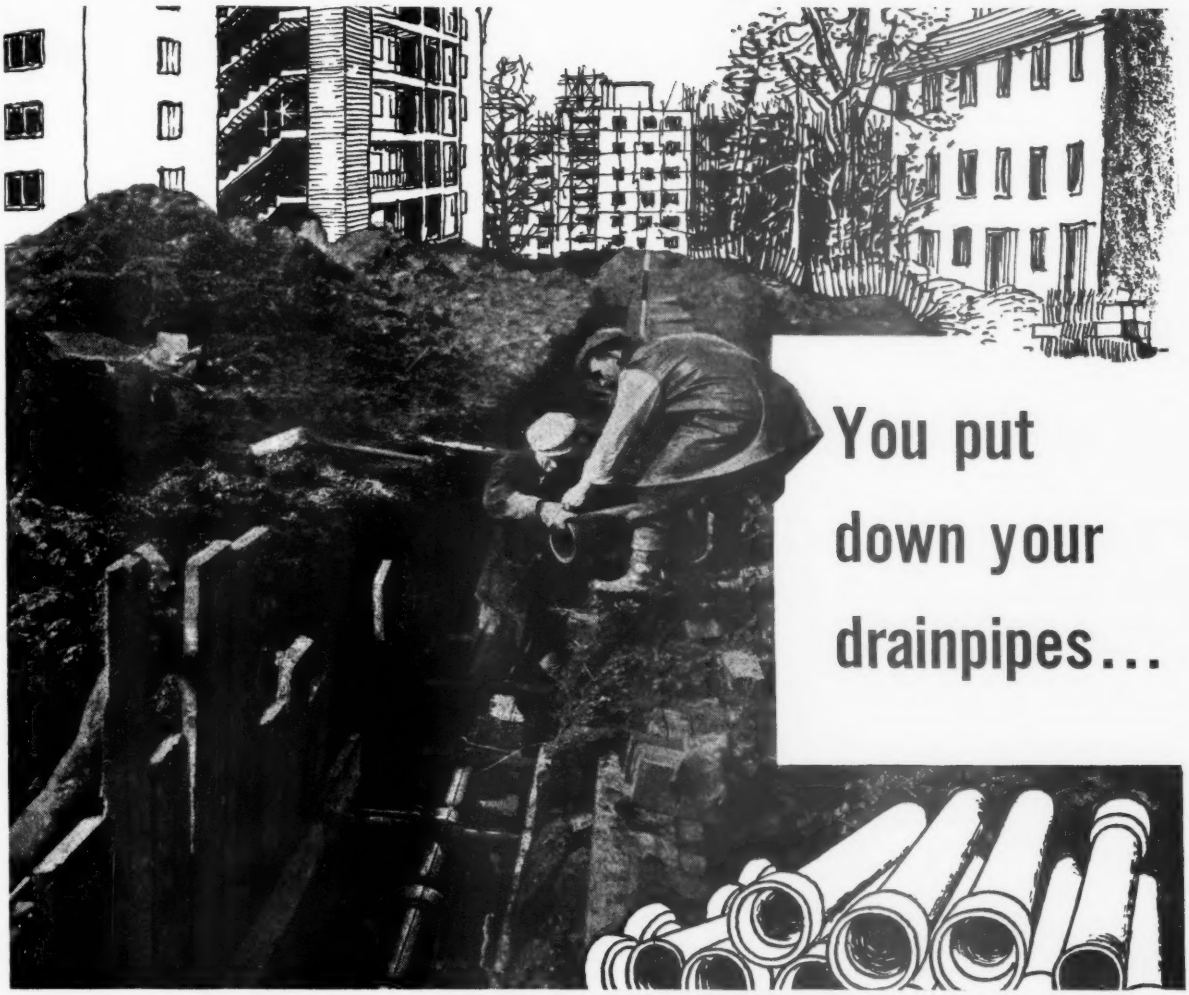

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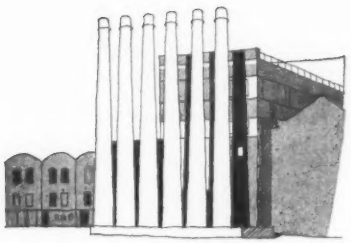
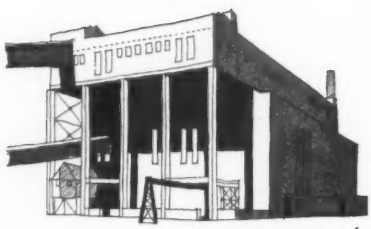


1.

2.

Whatever you build...

3.



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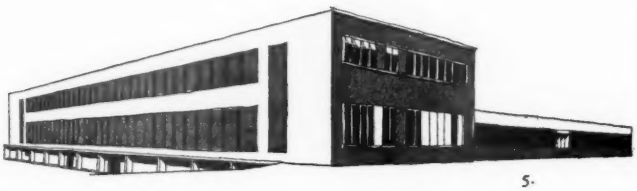

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Contractors: Woodall Duckham Construction Co. Ltd.
462,000 Phorpres Commons, 656,000 Phorpres Rustics, 1,800 Phorpres Specials.
5. FACTORY EXTENSION, VAUXHALL MOTORS LTD., LUTON.
Architects: Howard, Souster & Partners. *Contractors:* George Wimpey & Co. Ltd.
1,131,000 Phorpres Commons, 423,000 Phorpres Rustics.
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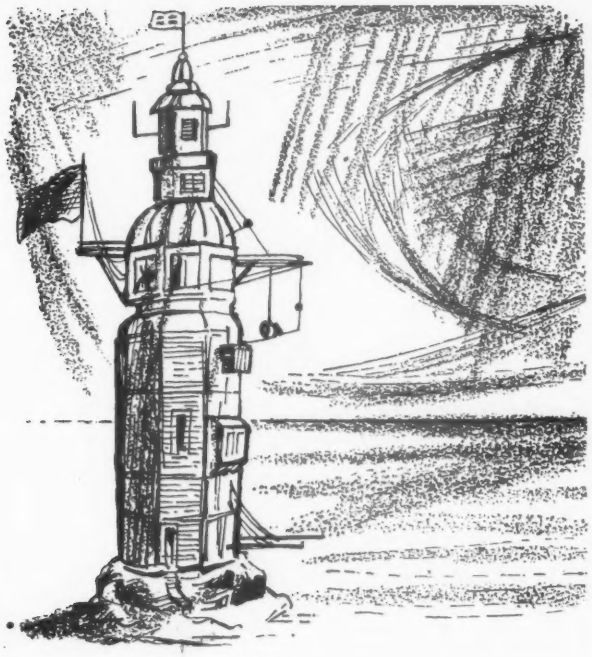

WINSTANLEY'S FOLLY...

DURING THE WINTER OF 1882, one man in Britain who had every reason to appear concerned was Sir James N. Douglass. Standing alone upon wave-swept rocks some fourteen miles from Plymouth was the lighthouse he had but recently erected . . . the Eddystone. No doubt, when lying abed and hearing the wind blustering outside, thoughts of the first builder of the lighthouse came into his mind. This was Henry Winstanley, an eccentric who created a wooden structure, pagoda-like, covered with paintings and gilded inscriptions. Winstanley would brook no criticism of his "masterpiece" and stated that he wished he might be in the lighthouse during the worst storm that could be imagined.

In 1703 he got his wish. When morning came, after a night of furious tempest, Winstanley, the keepers and the tower had gone . . . the rock was completely bare!

Douglass, however, was a man of different calibre. He had learned from the past and into his own building put the experience of himself and others. Wisely, he chose his materials with the greatest care, for he knew, too well, the destructive power of the elements. From the laying of the first stone until the light shone out over the dark waters, he radiated supreme confidence . . . and time has proved how justified this confidence really was.

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AUGUST 1954

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The Hon. Fellowship

The Rt. Hon. Vincent Massey, C.H., has accepted the Council's invitation to become an Honorary Fellow.

The Rome Scholarship in Architecture 1954

The Faculty of Architecture of the British School at Rome announce the award of the Rome Scholarship in Architecture for 1954 to Mr. G. I. Lacey, B.Arch. (L'pool). Mr. Lacey, who is 27, served for four years in the Royal Air Force and completed his architectural course in 1953, since when he has been a post-graduate student in the Department of Civic Design at the University of Liverpool.

The Faculty have commended the entry submitted by Mr. P. S. Staughton, B.Arch. (Melbourne), and have awarded him a special Rome Scholarship of one year's duration. Mr. P. S. Staughton is 25 and has been working at the University of Melbourne after completing his course there in 1953.

The Rome Scholarship in Architecture is provided for by an annual grant made to the British School at Rome by the Council of the Royal Institute of British Architects, and is normally tenable for two years.

Mr. Lacey's design is illustrated on pages 408–10 of this JOURNAL.

Conference and Demonstration: Improvement of Dwelling-Houses

The Agricultural Land Service, in conjunction with the Herts C.A.E.C., Country Landowners' Association, National Farmers' Union and Rural District Councils' Association, will hold a Conference concerning the Improvement of Dwelling-Houses on Wednesday, 22 September, at the Hermitage Hall, Hitchin, Herts, commencing at 10.30 a.m. to be followed during the afternoon by demonstrations at sites in the county of Hertfordshire.

This Conference will provide an opportunity for discussing the problem of reconditioning agricultural and other types of housing, particularly in relation to the Housing, Repairs and Rents Bill which it is anticipated will then have become law. Short papers will be read by members of the various organisations concerned and the Principal Regional Officer, Ministry of Housing and Local Government, will also speak. During the afternoon various dwellings will be made available for inspection and visitors will be able to see work in progress and completed improvement schemes.

Full details may be obtained from Mr. R. F. Smith, Agricultural Land Service, Brickendenbury, Hertford.

The Next R.I.B.A. Exhibition: Building in Concrete

An exhibition of photographs showing the architectural development of concrete and its use in building and civil engineering will be held at the R.I.B.A. from 21 to 30 October. It is being organised by the Royal Institute and the Joint Committee on Structural Concrete representing the Cement and Concrete Association, the Prestressed Concrete Development Group and the Reinforced Concrete Association.

As well as photographs from this country, a great deal of material has been collected from abroad and in particular there is a number of very interesting photographs of Italian and Swiss buildings. Belgium, Denmark, Finland, France, Germany and Holland have sent their contributions and there are also photographs from Australia, Brazil, India, Japan and South Africa. While most of the photographs shown will be of buildings designed during the last two decades, there will also be a section dealing with the early development of this material.

The National Buildings Record

The National Buildings Record has moved to 31 Chester Terrace, Regent's Park, N.W.1, from premises in South Kensington which it had occupied since 1945.

The move has meant package and transference of a library of nearly half-a-million photographs and measured drawings and more than 250,000 glass negatives of historic buildings in England and Wales. Among these negatives are the only existing visual records of many important buildings which have been demolished.

The National Buildings Record was established in 1941 at the suggestion of the R.I.B.A. and first housed at All Souls, Oxford. It is under the direction of an Advisory Council whose present chairman is Sir James G. Mann, and is financed by a grant from the Ministry of Works.

Postgraduate Scholarship for Architect

Mr. Ivan Dale Owen [*A*], of Ash Grove, Whitchurch, Cardiff, has been awarded a Fulbright Scholarship and a Smith-Mundt Study Grant for postgraduate work in the United States of America. He will spend a year at the Massachusetts Institute of Technology (M.I.T.), Cambridge, Mass., carrying out study and research work in City and Regional Planning.

Mr. Owen, who has been on the staff of the Cwmbran New Town Development Corporation, qualified at the Welsh School of Architecture in 1949.

Dudok's Seventieth Birthday

On 5 August the seventieth birthday of Dudok was celebrated at Hilversum at a charming ceremony when he was presented with a specially published book illustrating his work as an architect and town planner. The Committee of Honour which had arranged the ceremony contained a number of distinguished foreign architects, including Sir Howard Robertson. The presentation took place very appropriately in the Council Room of Hilversum Town Hall in the afternoon and was followed in the evening by a reception and banquet.

The proceedings were opened by the Burgomaster of Hilversum and there were speeches by representatives of Dutch and foreign societies. Many of the latter brought gifts; M. Marc Bitterlin (Paris), President of the Académie d'Architecture, presented a medal. Mr. F. R. Yerbury [*Hon. A*] presented a signed address of greeting from the President and Council of the Architectural Association. The Royal Institute's gift was presented by the Editor of the JOURNAL, deputising for the President R.I.B.A., who was unable to be present. It was an inscribed copy of *Town Design* by Frederick Gibberd [*F*]. The inscription was as follows:—

Willem Marinus Dudok
Royal Gold Medallist and
Honorary Corresponding Member R.I.B.A.
with esteem and affection
upon his seventieth birthday from the
Royal Institute of British Architects.

C. H. Aslin, PRESIDENT
C. D. Spragg, SECRETARY

London, August 5th 1954.

Below was the following quotation from the speech made by Dudok at the R.I.B.A. on the occasion of his receiving the Royal Gold Medal:

'Though in our architecture the efficient compliance with practical requirements guides and determines our work, this work only rises to the level of art if this matter-of-fact efficiency is visibly ennobled by a high-souled thirst for beauty. A beauty which, in our day of new materials, of a new attitude towards life and new aims, can exhibit fresh and striking facets, but which, nevertheless, is based on the eternal laws of the scarcely definable harmony of proportions. *W. M. Dudok*, April 15th 1935.'

Mr. Francis Keally (New York) represented the American Institute of Architects and Mr. H. Wylie [*A*] the Royal Incorporation of Architects in Scotland. Mr. H. van der Weijde spoke first in Dutch as representative of the Dutch Institute for Housing and Town Planning and then in English as Secretary-General of the International Federation for Housing and Town Planning.

Dudok replied, obviously much moved by the occasion; we have asked for a translation of his speech which we hope to publish in the next JOURNAL. The many British architects who know him will be pleased to hear that he is in fine health and does not look his age. The Town Hall, looking as if it had been built last year, formed a magnificent setting for the ceremony; the trees and flower beds and flower boxes were superb, the fountains were playing and the sun shone brilliantly in at the windows of the green, gold and oak Council Chamber.

At the reception and banquet, given by the Burgomaster of Hilversum, guests included members of the Netherlands Government and the foreign visitors. Dudok, wearing his Royal Gold Medal, made one of the many informal speeches which were in a charming mixture of Dutch, French and English.

The Architecture Club

A dinner of the Architecture Club was held at Skinners' Hall on 21 July; the President, Viscount Esher, in the chair. The speakers were Mr. John Summerson, C.B.E., F.S.A. [*A*], Sir Kenneth Clark, K.C.B. [*Hon. A.*], and Professor A. E. Richardson, R.A. [*F*].

The Rate of House Building

THE FINANCIAL TIMES has published recently some remarkably interesting figures about the present boom in small house building. New houses are now being started at a rate of well over 400,000 a year, of which 150,000 are by private enterprise. In the first four months of this year, local authorities completed 73,828 houses as against 72,997 in the same period last year; private builders completed 24,312 as against 15,248. The wet spring weather must have slowed building somewhat so that, given the usual greater output in the autumn months, it seems likely that 350,000 houses will be completed during 1954.

The easing of licensing restrictions and increased supplies of materials, notably softwood and cement, are the principal factors in this greater output. THE FINANCIAL TIMES also points out that the labour force in the building industry has not increased, so that there has been improved productivity, probably as much as 7½ per cent; the same number of men are building more and faster.

Much of this private enterprise building is undoubtedly by speculative builders but, while no figures are available, it seems probable that a larger proportion than in pre-war years is under the direction of architects for private clients.

Two notes of warning are sounded by THE FINANCIAL TIMES in an editorial commentary on the figures. The first is that, while supplies of materials are at present keeping pace with the rise in productivity, most of them ultimately depend on the supply of coal. The second is that the Government may have to take steps to limit the proportion of capital expenditure now going into building. It seems, they say, that the Government would like to see house production stabilised at about 325,000 per annum, because there are the rival claims of transport, both roads and railways, and of industrial investment to be considered.

In another editorial it is suggested that the gross housing demand is already nearly met, but not as regards location of houses. Slum clearance is estimated to involve about one million houses.

The I.U.A. Review

The Bulletin of the International Union of Architects has had a rather chequered career. It appeared originally on the back page of a French architectural publication and later (after two numbers had been published on duplicated sheets) as a supplement to the Florentine review ARCHITETTI. It is accordingly a matter for congratulation that it has now achieved an independent existence as a bi-monthly review, and produced its first two numbers.

The first of these dealt mainly with the I.U.A. Congress at Lisbon last year, an account of which appeared in the JOURNAL for November 1953. A competent English translation accompanied the text and an insert carried a version in Spanish. The material was interesting and the standard of layout and illustration was high. It is unfortunately a matter of general agreement that this standard has not been maintained in the second number. This also contains some interesting material, but the English translation is inadequate and is sandwiched awkwardly between the text and the Spanish version. The layout generally is a decided obstacle to the reader.

The attention of the I.U.A. Secretariat has been drawn to these deficiencies and it has undertaken to remedy them as far as possible, but it must be admitted that a considerable share of the blame for the decline must be borne by architects generally, since they have not given the REVIEW the support it needs if it is to fulfil its purpose. The I.U.A. REVIEW deserves encouragement from every architect who takes an interest in matters of international significance; with adequate support it might become a most valuable expression of the aims and opinions of architects all over the world.

The annual rate of subscription is 2,000 francs (£2) and application should be made to the Société Achéco, 57 rue de Châteaudun, Paris 9. Further information can be obtained from the Secretary, U.K. Committee of the International Union of Architects, c/o the R.I.B.A.

The Royal Festival Hall Organ

by H. Creighton, M.A. [*A*]

COLBY: Do you think that they would give me a trial? . . . . . .
. . . I've told you, I'm not a very good organist!
EGGERSON: Don't say that, Mr. Simpkins, until you've tried our organ!
T. S. Eliot: *The Confidential Clerk*

WITH THE inauguration of the organ at the Festival Hall on 24 March the London County Council revived some of the spirit of expectancy and discussion which accompanied the opening of the hall itself three years ago. Here again was a new contribution to our musical life, and we were invited to make up our minds about it. But this time the subject was more recondite than before. Even among musicians the organ occupies a rather isolated position. Its devotees are few compared with those of the orchestra and have much in common with, let us say, railway enthusiasts; there is the same wholehearted devotion, the intricate jargon, and the preoccupation with matters in which the ordinary person may find it difficult to see the relevance to his comfort as a traveller or his pleasure as a listener. A visit to the Festival Hall is sufficient, however, to dispel the ignorant prejudices of those of us who had despaired of the capacity of organs—and of organists—to make music, or had doubted the importance of the instrument's design in this connection.

There is a further reason why it deserves the attention of architects. A proposal to include an organ in a building may radically affect its design, and is therefore a matter on which the architect may wish to advise his clients. How large need it be? How often will it really be used, and for what purposes? Would an electrophonic organ, using loudspeakers instead of pipes, be as good? Can it be stowed away out of sight in an odd corner behind a grille, or must it, if it is to be worth having at all, occupy the most commanding position in the room? Will its presence interfere with other uses of the building and its requirements conflict with them? These are the sort of questions he will ask himself, and others, and to which he will probably receive a variety of replies. For the answers to them are not purely matters of fact, but involve a judgment of the value and functions of the organ and of the musical qualities and limitations which it possesses. It is because this was so fully recognised by Mr. Ralph Downes, the designer of the Festival Hall organ, and because his design embodies a clear and consistent musical purpose, that the instrument is of such outstanding interest, and the measure of its success will be a valuable guide for the future.

But its appearance alone is sufficiently impressive. Visually, the hall has until now been incomplete and, it must be confessed, somewhat dispiriting. The illuminated ranks of pipes, apparently infinite in number and complexity, provide the climax that was lacking and are wholly appropriate in scale, in colour, and in contrast. At first sight eyebrows will be raised at the grotesquely unfunctional proportions of the dummy pipes in the centre—as if their designer were terrified that they might be mistaken for real ones—but they quickly cease to irritate and obtrude, and they give the necessary emphasis to the design.

The whole of this treatment was suggested by the needs of the instrument. In Mr. Downes's opinion it was of prime

importance that it should be placed in the usual position at the back of the platform, and that the organ chamber should be large, open, and relatively shallow from back to front; the pipes must not be crowded together and their sound must not be obstructed from reaching the audience by case-work or grilles. These ideas are similar in principle to those underlying the design of the orchestral platform, which is also intended to 'expose' the instruments to the audience, and in both cases they are surely justified by results. But in detail they were difficult to reconcile; one consequence of the size of the organ opening is that the hall is wider at the platform end than it would otherwise have been and the blending of orchestral tone suffers from this. Also, the height of the reflecting canopy is a compromise; for the sake of orchestras and choirs it would be better if it were lower, but even at its present height it is thought to be to some extent obstructive to the organ. These conflicts are the direct result of the size of the organ and would be easier to resolve in the case of a smaller instrument, a point to which we shall return later.

There were fears at the design stage that the exposure of the organ at the back of the platform, where otherwise there would have been a hard reflecting surface, would be bad for orchestral tone. These fears seem to have been unfounded and the folding screens which can be closed to shut off the organs are in fact left open even for concerts when it is not in use.

Difficulties of this sort would be greater in other halls not exclusively devoted to music. The experience of the Festival Hall seems to show that a reasonably satisfactory compromise is possible at the cost of fairly strict limitations on the design. Whether the compromise and the limitations are worth accepting must depend on the musical success of the organ.

Differences in opinion on this question reflect a controversy which has been in progress for some time in the organ world. Briefly it is between the supporters on the one hand of the traditional English organ, which is typified by the best instruments in our churches and is largely the product of the work of late 19th-century organ-builders, and those on the other who take as their models the so-called 'baroque' instruments of the 18th century. The difference in effect may be compared roughly with that between the orchestra of Bach or even Mozart and that of Wagner or Strauss; it represents a change in emphasis from precision, delicacy, and contrast in combinations of sound towards smoothness, sonority, and grandiloquence, and it corresponds with the accompanying change in musical thought. The 'traditional' school sees this change as an improvement in organ tone. We are all familiar with the undeniably beautiful and emotive sound of the full organ in a cathedral and it is this weighty and 'saturated' tone, as we know it in this country, that they regard as the hall-mark of the organ. The 'baroque' school may or may not dislike such tone in itself, but at any rate point out that it is quite unsuitable for contrapuntal music, because it produces an impenetrable and opaque mass of sound in which the individual parts cannot be heard. And since the masterpieces of the organ are unquestionably the works of Bach there is justification for the view that the 'right' sort of instrument is the one best fitted to their interpretation. As if to emphasise this the first public recitals in the Festival Hall were a series of six devoted entirely to Bach. Mr. Downes belongs to the 'baroque' school (though this does not mean that he has ignored the requirements of later music), and by giving us the first large instrument in this country in which these principles have been followed and adapted to modern practice and needs he has enabled us to judge the matter for ourselves.

The verdict has not been unanimous. Some find the tone of the instrument ugly—'lean and hungry' as THE TIMES critic put it—and complain of its harshness and stridency. Others, myself among them, feel that it reveals the organ as a solo instrument in a wholly new and more favourable light, that at last we are able to hear, rather than take on trust, the structure of Bach's works, and that its timbres, though unfamiliar, are eminently suited to them; nor is there any reason to complain of its adequacy for romantic music. Much, of course, depends upon the performer—particularly in the case of an instrument so prone to vulgarity as the organ; we have had vulgarity in the Festival Hall, and dullness, but also—notably from Mr. Downes himself—true musicianship which has been amply rewarded by the instrument.

But having said as much it must be admitted that the instrument is not, and never could have been, so well rewarded by the hall. Soon after its inauguration the B.B.C. broadcast a very interesting programme comparing the Festival Hall organ with one recently built on similar lines in the Fraumünster at Zürich. The enhancement of the tone of the Swiss organ by the long reverberation of the church was very striking. Mr. Geraint Jones remarked on this in a commentary on the programme, and attributed the criticisms of the Festival Hall organ as strident to the short reverberation of the hall, for which he blamed the design of the building. Now though the Festival Hall might with advantage have had a reverberation time as long as about 2 seconds, anything approaching that of a large church (4–10 seconds) would have been not only impossible but disastrous to orchestral music. If, therefore, it is true, as organ-builders have always maintained, that organ tone requires church conditions in order to show its full beauty, then the conclusion must be that it cannot do so in a concert hall. There is good reason to suppose that this is the case, and especially for 'baroque' instruments.

First, because the player can do no more than open or close the pipes and not influence their speech in any other way (except, clumsily, with the swell-box), there is a basic inflexibility and danger of monotony about organ tone. Reverberation helps to mask and smooth over this mechanical element so that it is less apparent.

More fundamentally, it is difficult to resist the conclusion that the purpose underlying the evolution of the organ was precisely to produce an instrument capable of contending with the extreme difficulties of church acoustics. Clearly a considerable volume of sound is necessary to fill a large church, but under very reverberant conditions more strength means less clarity, so that music would be limited to a single part moving slowly, as in plainsong. Again, churches contain, characteristically, very few middle frequency absorbents except the congregation, and the same is usually the case for low frequencies too; but there is always a fair amount of high frequency absorption—the air, rough stonework, dust, mouldings which inter-reflect short wavelengths—so that reverberation falls off sharply at high as compared with low and middle frequencies. This again is unfavourable to clarity of parts and notes, which depends upon high frequency components being heard.

These points are illustrated in the figure which compares the reverberation-frequency curves for the Festival Hall with those for St. Paul's Cathedral and for two churches in Swabia which contain famous organs built between 1729 and 1750 by Josef Gabler. Weingarten Abbey is a very large baroque building. Ochsenhausen is smaller, a baroque conversion of a Gothic church; it is included here as an example of a church with a comparatively short reverberation. This acoustic type—Bach's Thomaskirche at Leipzig and some of our own single-cell perpendicular churches are other instances—is very important, because in them music is not subject to the extreme restraints of cathedral conditions. But reverberation is still far longer than in the Festival Hall and falls at high frequencies.[1]

We may imagine that the emergence of polyphonic music presented organ-builders with this problem of achieving clarity and strength of tone in the face of long reverberation in a very acute form, and that their efforts to solve it are responsible for the artistic character of the developed instrument as we know it. The reed stops, with their incisive tone, are one help towards solving it. Another is the very ancient system by which diapason tone is enriched and strengthened not by combining several stops all sounding at unison pitch, but by adding to one unison (8 ft.) stop others which sound octaves and other harmonics (fifths and thirds) above it; such stops are called mutations and mixtures. This method of synthesising tone is the unique property of the organ; its other effects can be more or less paralleled on other instruments, but the diapason chorus cannot, and it seems to be intended to compensate for the absorption of high frequencies in churches by artificially reinforcing them.

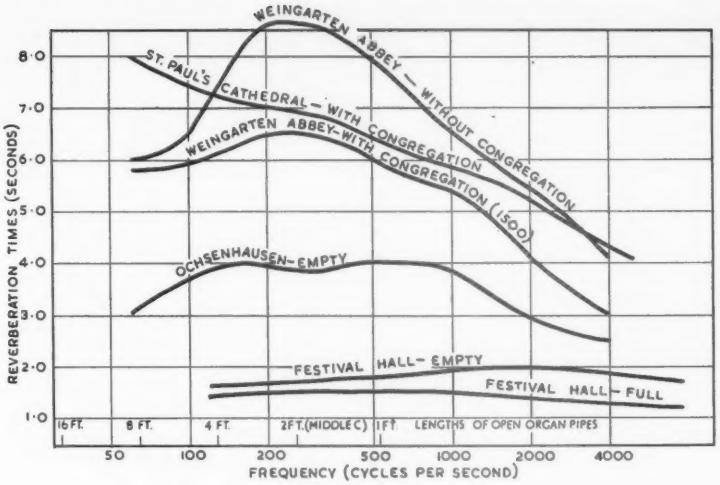
If it is true that the organ's most individual characteristics are those which have this clear acoustical purpose, then 'true' organ tone should be that which exploits most fully its own peculiar resources for

that purpose and not for another. This is the special excellence which is rightly claimed for the 18th-century instruments. They are rich in mixtures and in reeds; stops are lightly voiced, with emphasis on individuality rather than on power; strength is obtained by the combination of many stops rather than by a few loud ones; transients—little puffs and buzzes which initiate the sound and assist quickness and definition of speech—are not eliminated; the separate divisions of the organ are complete instruments, contrasted yet capable of combination, and this applies to the pedal organ as well as to the manuals. Analyses of some of these organs (such as those at Weingarten and Ochsenhausen) show that their builders succeeded, empirically and by ear alone, in matching their tone to the acoustics of the buildings and to the sensitivity of the human ear with an accuracy which could not be surpassed by scientific methods.[2] There is a logic connecting the acoustics of the buildings, the instruments, and the music played on them; each of these three elements can be varied within limits, but not to such an extent that the connection is broken.

This is precisely what happened subsequently. Here are some of Schweitzer's criticisms of the 19th-century organ. 'The lighter manuals are weak in comparison with the great organ. . . . Our pedals are coarse and clumsy. . . . The trouble comes principally from the change in the disposition of the organs, the relation between diapasons and mixtures having been altered, wholly to the detriment of the latter. . . . In our passion for strength of tone we have forgotten beauty and richness of tone, which depends upon the harmonious blending of ideally voiced stops.'[3] These are the reasons for our lack of pleasure in so many of the organs we hear.

But if to change its tonal structure in this way is to ignore the limitations of the instrument in one respect, to build it in the alien acoustical surroundings of a secular hall is to do so in another. The very excellence of the baroque organ in the right sort of building makes it the more difficult to adapt to another. In the Festival Hall the effect of the mixtures, which we have seen to be so important an ingredient of organ tone, is precisely the reverse of what it should be; in the full organ they confuse rather than define the parts, because high frequencies are too active in the hall in any case and do not need reinforcement, so that in consequence we hear them moving parallel to instead of blending with the unison tone. Nor is there a long enough reverberation to complete the transformation of the machine into a musical instrument.

In another respect, in its experimental approach to organ design, it is very appropriate to a building in which so much has been experimental. If we conclude that it is the right instrument in the wrong place, this is not to deny it a large measure of success; if it casts doubts upon the wisdom of building even the best organs in secular halls, it shows how much the richer we should be if our churches contained such fine instruments of this type.



So far we have been thinking of the organ as a solo instrument, though solo work is seldom the chief part of an organ's duties. We have done so because it is the most difficult test and the one that brings out most clearly differences of design; also because it is only for solo purposes that an instrument anything like as large as this one is required, and size is one of the architect's main concerns in the matter.

The other functions for which an organ may be needed in a concert hall, and for some of which it is indispensable, are: (1) Continuo for choral works. (2) Accompaniment to massed voices—community or hymn singing. (3) As an instrument in the orchestra; not often necessary. (4) As a concerto instrument; in the current normal repertory, only the concertos of Handel. (5) To supplement amateur resources, e.g. for obligato parts, or for the whole accompaniment, in choral works.

For these purposes the claims of the electrophonic organ must be considered. They are that it is less expensive than all but small pipe organs, that it makes no demands upon space, and that it can do the job sufficiently well. It could, in fact, give an adequate account of (1) and (3) above. But in many places (2) is likely to be essential, and here we must take note of the authoritative opinion of the members of the Organs Advisory Committee of the Central Council for the Care of Churches, who include several of our most distinguished organists, that the electrophonic organ is entirely unsuitable for accompanying massed voices. Nor would it fulfil (4) and (5) so well as a very modest pipe organ of good design. Also each electrophonic organ is identical with all others of the same model, but each pipe organ is individual and can by its sound and by its appearance contribute its own character to the building it is in.

An electrophonic organ is preferable to a pipe organ which is not used often enough to justify the expense of its installation and maintenance; such cases are not infrequent. But in general, even though its musical capabilities are at present rather limited, the electrophonic is better regarded as a new instrument in its own right than as a substitute.

A pipe organ to fulfil requirements (1), (2), and (3) above, in a hall of moderate size, would need 20–25 speaking stops on two manuals and pedal; its size would be about 15 ft. by 10 ft. by 19 ft. high (floor to ceiling of organ chamber). If increased to 30 stops on three manuals it could in addition give a tolerably faithful rendering of solo music, so far as resources are concerned. The extra stops would only very slightly increase its size.[4]

Such an organ would not make difficult demands on space, but less than any other should it be packed into a restricted chamber; it would be best placed in the main volume of the hall with a wall behind it. This means that it must be accepted as visible in one way or another, though a very light mesh or grille would probably not have a noticeable effect on the sound.

An instrument of this sort is not to be despised in comparison with the Festival Hall's 102 stops. Economy can be a virtue in organ design and, if cost is a limitation, size is always to be sacrificed to quality. Many of the old organs which inspired the Festival Hall instrument are no larger.

References

1. These data are taken from:
   WIRELESS WORLD, February 1952, p. 55.
   ACUSTICA, Vol. 2, 1952, p. 111.
   ACUSTICA, Vol. 3, 1953, p. 12.
   For the Thomaskirche, see Bagenal, H., and Wood, A., *Planning for Good Acoustics*, pp. 222–4, 369–72.
2. Lottermoser, W., 'Vergleichende Untersuchungen an Orgeln', ACUSTISCHE BEIHEFTE, Heft 1, pp. 129 ff.
3. Schweitzer, A., *J. S. Bach* (English translation), p. 296.
4. I am indebted for these estimates to Mr. Cecil Clutton.

The two piles and their shafts. One of the four blower houses is in the foreground

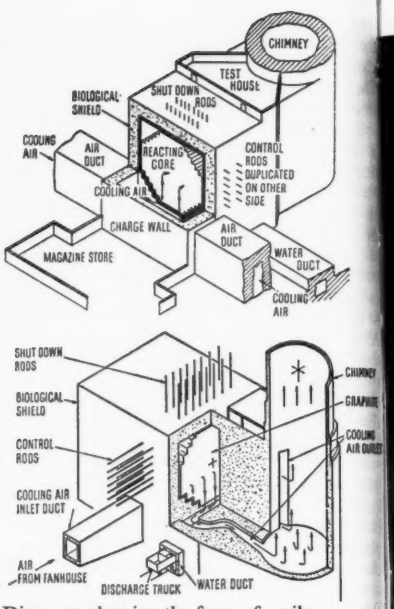
Windscale Atomic Energy Factory, Sellafield, Cumberland

MUCH HAS BEEN WRITTEN about the potential benefits to mankind of the new atomic source of energy, though so far we have experienced little more than its destructive capabilities. This genie has been released from its bottle; impersonal and obedient, it will do whatever mankind in its wisdom or folly directs. Architects, being creators of human environment, have no interest in the destructive powers of atomic energy, but they expect its peaceful employment to affect their work considerably.

Therefore the first press visit to the Windscale factory, held recently, was something like a peep into the future. That mysterious synthetic substance, plutonium, has hitherto been made under conditions of extreme secrecy. We now saw it being made, and in a plant quite unlike anything we have known previously. Giant, massive buildings, with miles of pipes containing a variety of mysterious liquids, all serviced by men in white coats, gave one the feeling of being in a huge laboratory. Except in the blower houses, there was no noise; there was also little visible movement of materials, raw and half finished, of the kind one associates with a factory. More obvious was an elaborate system of protection against that silent and invisible but deadly peril, atomic radiation.

We met the men who ran the factory and those who built it. The former seemed mostly to have come from government explosives factories or from the chemical industry. The latter were young Associates and equally young engineers, both civil and mechanical. We saw few who appeared older than 45 and most seemed in their early thirties. These men, from the Ministry of Works staff, had been set the task of building Britain's first atomic factory at a time when little was known about the design of such a plant, when the whole subject was secret and production was a matter of extreme urgency.

To build an entirely novel kind of job, and a very large one, against time, under rigid conditions of secrecy, and with the clients often not knowing what they wanted until construction had started, sounds like an architect's nightmare. Yet perhaps the most surprising thing about this factory from the architect's point of view is that the buildings show none of the usual signs of a change of plan during



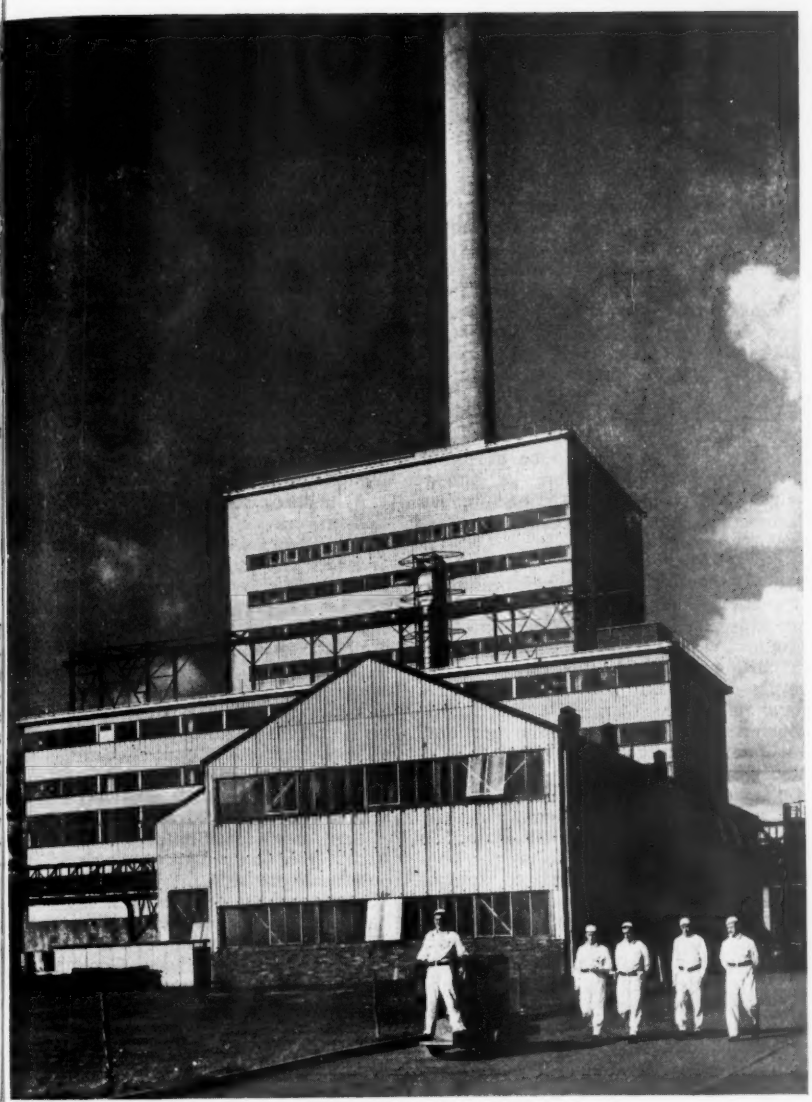
Diagrams showing the form of a pile

construction. Everywhere they look as if they had been designed with full foreknowledge of every detail and had been erected according to a well-ordered programme. And in one sense the programme was a well-ordered one, in that the job was organised from the start to permit changes to be made. The teams of architects and engineers were prepared for them, the foundation slabs being designed to allow them, pipe bridges and ducts were designed with sufficient margins for additional pipes, and the various units planned fluidly to accommodate unanticipated items of equipment.

Windscale is a plant for producing plutonium only, for use in atomic bombs and in the form of isotopes for industrial and medical purposes. The raw materials are 99·4 per cent uranium 235 and 0·6 per cent uranium 238. These are combined in two atomic piles which have an internal temperature of 400 deg. C. The heat is removed by air cooling, the air passing up two 415 ft. high, 40 ft. diameter chimneys and filtered at the top. The products of the pile are processed in a treatment plant and there are numerous ancillary buildings.

Although this is the first plutonium-producing plant in the British Commonwealth it is unlikely to be repeated. On a site adjoining Windscale there is being erected another type of plant, the Calder power station. Whereas at Windscale the product is plutonium and the heat is dissipated, at Calder the product will be heat and the plutonium a by-product. The heat will be used to raise steam in heat exchangers and the steam used to generate electricity in turbo-alternators. Calder, therefore, is the true prototype of the future atomic factory.

The two piles at Windscale are identical. The pile is a reinforced concrete box with 6 ft. thick walls and roof and 80 ft. high.



The primary separation building is 200 ft. high and has a 200-ft. shaft on top

It is packed with accurately machined graphite blocks and has an insulating lining. Control rods of barium enter at two opposite sides and 'shut down' rods can be dropped through the roof to stop instantly the action of the pile. The chimney or ventilating shaft is placed on top of the pile and at the sides is a pair of blower houses whence cooling air is forced through reinforced concrete ducts into the pile and up the shaft.

Each pile has a total load of 58,000 tons, which is carried on a raft 200 ft. by 100 ft. by 10 ft. thick. The raft was designed as a flange to the superstructure. The bearing capacity of the soil is 2½ tons per sq. ft.

An example of the 'hand-to-mouth' work of the designers was the decision to place air filters, weighing 2,000 tons, at the top of the shafts, after the piles had been designed. These filters account for the bulges at the top of the shafts and for the lift casing at the side. The shaft was built 6 ft. out of vertical to minimise the eccentric loading of the filter gallery. A lining of aluminium alloy plates and insulating material protects the inner face of the concrete against erosion and thermal stress.

The products are discharged from the pile into an underground water-filled duct, whence they are conveyed to open cooling ponds 350 ft. by 80 ft. and 22 ft. deep, of which 18 ft. is above ground. The cans containing the products are opened under water by long-handled tools.

The primary separation building is a steel framed and sheeted structure 150 ft. by 110 ft. by 200 ft high. Centrally placed in the building is a reinforced concrete box-like structure 100 ft. by 60 ft. and 200 ft. high. Within this box the second stage of the process takes place, remotely controlled from the outer framed building. On the top is a 200 ft. high reinforced concrete ventilating shaft, 17 ft. diameter at the bottom and 9 ft. at the top; it is lined with stainless steel. The whole building is carried on a cellular raft 160 ft. by 20 ft. by 20 ft. deep; the total load is 25,000 tons. Because of the height of the structure and the very exposed site, exceptional allowance had to be made for wind, which alone can produce loads of 200 tons on the stanchions.

The solvent recovery plant is similar but somewhat smaller. It is subdivided into six reinforced concrete cells within a sheeted building. Special expansion joints had to be provided to ensure that differential heat expansion did not unduly affect the concrete structure.

The many other buildings, such as administration, laboratories, medical centre and health physics centre, were either adapted from the remains of a derelict wartime explosives factory which occupied the site or were newly built. In the 'hot' laboratories many special precautions, dictated by the handling of radioactive matter, had to be taken; these included a ventilation system with a capacity of 350,000 cu. ft. of air per minute.

The effluent outfall to the sea consists of a twin pipeline laid in a 30 ft. wide cutting and extending some two miles out to sea. After the sea bed had been cleared of boulders by divers, the Admiralty undertook the job of towing the pipelines from the land out to sea. This was done in providentially calm weather. A tug towed the end of the pipe, towing being stopped every half mile to allow a new length to be welded on; at the completion of the tow, the end of the pipe was lowered to the sea bed.

The site is a remote one. This meant that housing of staff and labour had to be undertaken. For the staff an existing hostel six miles away was utilised and has since been expanded. Sixty-four aluminium bungalows were also erected and, later, some local authority housing at Seascale and Whitehaven was allocated. A small existing camp nearby served as a nucleus for a large hutted camp accommodating 600. Six miles away another camp was adapted and enlarged to hold 1,500. Some local labour was obtained, the labour force starting at 1,000 in 1947 and expanding to 4,750 in mid 1950.

The M.O.W. Mobile Labour Force started the work but, later, six firms of general contractors were employed as well as numerous specialists and sub-contractors.

The foregoing is but a brief outline of an immensely complex and difficult task involving many new techniques and the training of contractors in them, working to tolerances much closer than is customary in the building industry and constructing an entirely novel series of buildings on a remote site.

The work was under the direction of Sir Charles Mole, K.B.E., M.V.O. [*F*], Director-General of Works, The Ministry of Works, on behalf of the Ministry of Supply's Division of Atomic Energy—now the United Kingdom Atomic Energy Authority.

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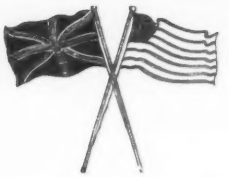


The Annual Convention of the American Institute of Architects

Again we have 'traded' an account of the British Architects' Conference for one of the A.I.A. Convention with Jeanne Davern, Associate Editor of the ARCHITECTURAL RECORD. *Although their Convention is a much larger affair than our Conference, our American colleagues having to conduct at it much business of kinds we cover at our monthly Council and General Meetings, we can blush modestly at a covering note by Jeanne Davern. Referring to the Convention's technical discussions, she says, 'There's never anything like that fabulous Allen-Mills performance'.*

Boston itself was the major attraction of the 86th annual convention of the American Institute of Architects, held in that city 15–19 June. Nearly 2,200 architects and their guests registered at the convention's Hotel Statler headquarters and they were exposed to the usual mélange of seminars and speeches, business sessions and elections, official and unofficial breakfasts, luncheons, dinners, cocktail parties, receptions, exhibits and tours; but this year, because the A.I.A. was meeting in Boston for the first time in many years, the tours, both public and private, and such social events as 'A.I.A. Night at Pops'—Boston's beloved summer concert series at Symphony Hall—seemed to get much more than the usual attention. Not only is Boston one of the most 'historic' U.S. cities, but its environs have some of the most famous monuments of contemporary architecture—everybody at the convention, for example, seemed determined to get to nearby Cambridge to see Eero Saarinen's thin shell concrete dome, Massachusetts Institute of Technology's new auditorium, now under construction.

The programme, crowded as ever, with every session spilling over into the next, managed to encompass architectural education, school and hospital design, architectural philosophy, materials and methods, the allied arts, public relations and organisational problems, election of officers, installation of new Fellows and the awarding of diverse other honours—all in addition to the full calendar of social events, exhibits and tours.

Far and away the most memorable session of the convention, by general agreement, was the one which brought Paul Rudolph,[1] Eero Saarinen, José Luis Sert, William Wurster and Ralph Walker to the platform to discuss 'The Changing Philosophy of Architecture'. Although the speakers might generally be considered to represent some quite diverse points of view, it was the basic agreements between them, rather than the differences, which were most remarked on this occasion. Perhaps it should be noted that *beauty* is now a respectable word in the vocabulary of even the most modern U.S. modern architect. For flavour, some quick (and therefore of course inadequate) quotes:

Rudolph—'An architect is not merely a beautifier, but our profession should and will die unless we produce that which reflects man's highest aspirations.'

Saarinen—'There seems to be a lack of enthusiasm for architecture as an art within the profession. Architecture has become too much of a business—a big business.'

Sert—'Today we need a new vocabulary, rich and flexible. Functionalism alone does not satisfy our needs. The clean-up of the Twenties was needed, the purist-functionalist period that followed was the natural result. But now we should have something more than mere practicality, which need not conflict with the functional but should add other elements to it.'

Wurster—'Always the question of what is logic or what is beauty. I think of the city planning approach which always states San Francisco streets should be on the contours—*logically*. The streets go straight over the hills, and in the early days not a car could make them, just as in earlier days not a horse could make them. As the years have gone by cars have improved so it now makes sense, and all the time you see the water, and it is yours by token of its being at the end of the street—instead of being confused with the houses like a sheep dog's hair over its eyes. Here we have gained something, and very few people have analysed the logic of this beauty.'

Walker—'The shallow and the mean will persist, unless we cease to be satisfied with mere surface neatness and seek beauty in emotional depth; unless we realise that gracious form is not achieved by structure alone, but through social and spiritual needs which indicate symbolically that man is man. The symbol we seek is that of human greatness, of the far searchings of the human intelligence, of the soul's aspirations toward hope, compassion and love; of humanity as a stirring ideal, its enhancement a possible goal.'

There was only one technical session at this year's convention—a panel discussion, 'What's New'. Engineer Paul Weidlinger of New York, discussing structural developments, noted that interest in earthquake- and blast-resistant construction has speeded up research in the field of structural dynamics and predicted that structural design generally would benefit increasingly from attention to dynamic as well as static loads. C. L. Crouch, technical director of the Illuminating Engineering Society of New York, urged that more attention be paid to subjective aspects of lighting functions. Engineer Charles S. Leopold of Philadelphia described some recent air conditioning installations and Ben John Small, New York architect and specifications authority, gave a quick résumé of noteworthy new building products.

A luncheon seminar on 'The Impact of Government on Architecture' brought a warning from Miles Colean, Washington architect and economist, that government is acquiring a 'pervasive' influence in shaping architecture in the U.S. The other speaker on that seminar, Past President Michael Waterhouse of the Royal Institute of British Architects, gave his listeners some idea of how 'pervasive' government influence can get when he estimated that in his country last year at least 80 per cent of all construction was controlled directly or indirectly by the government.

The architectural education seminar heard a report from Prof. Turpin Bannister of the University of Illinois Department of Architecture on the two-volume report (just published) of the A.I.A.'s 1950 Survey of Education and Registration. Professor Bannister, a member of the Commission which conducted the survey and author of Volume I, emphasised the Commission's firm belief that (1) a 20 per cent increase in architectural student enrolment during the next decade is essential to keep the profession growing to meet its expanding opportunities; (2) all members must join a concerted campaign to increase professional competence; and (3) programmes for professional education and registration must be 'intensified, systematised, refined, deepened and integrated' to meet the demand for increased competence. The A.I.A. has, of course, no formal relationship either with architectural schools or registration boards.

Clair W. Ditchy of Detroit was re-elected president of the A.I.A. for a second one-year term. The Gold Medal was not given this year; but the Edward C. Kemper Award for Service to the Institute went to Henry Saylor, editor of the A.I.A. JOURNAL; the Fine Arts Medal to Julian Hoke Harris of Atlanta, architect and sculptor; and the Craftsmanship Medal to Maria Montoya Martinez, Pueblo Indian potter. Twenty-one members of the A.I.A. were advanced to Fellowship in a ceremony at the annual banquet—among them Walter Gropius (in absentia) and Ludwig Mies van der Rohe.

[1] Aged 35, from Sarasota, Florida, won the Young Architects' Prize at São Paulo this year.

Church of St. Francis of Assisi, Bristol

Architects: Potter and Hare [F/A]

THE ARCHITECTS were awarded the R.I.B.A. Architecture Bronze Medal in the area of the Wessex Federal Society of Architects for the three years ending 31 December 1953 in respect of this church.

The site was formerly occupied by a Victorian church, built in red brick with pennant stone dressings, but it was burnt out by enemy action during the last war. It was larger than the present building as it seated 700 persons, whereas the new church seats 450 persons.

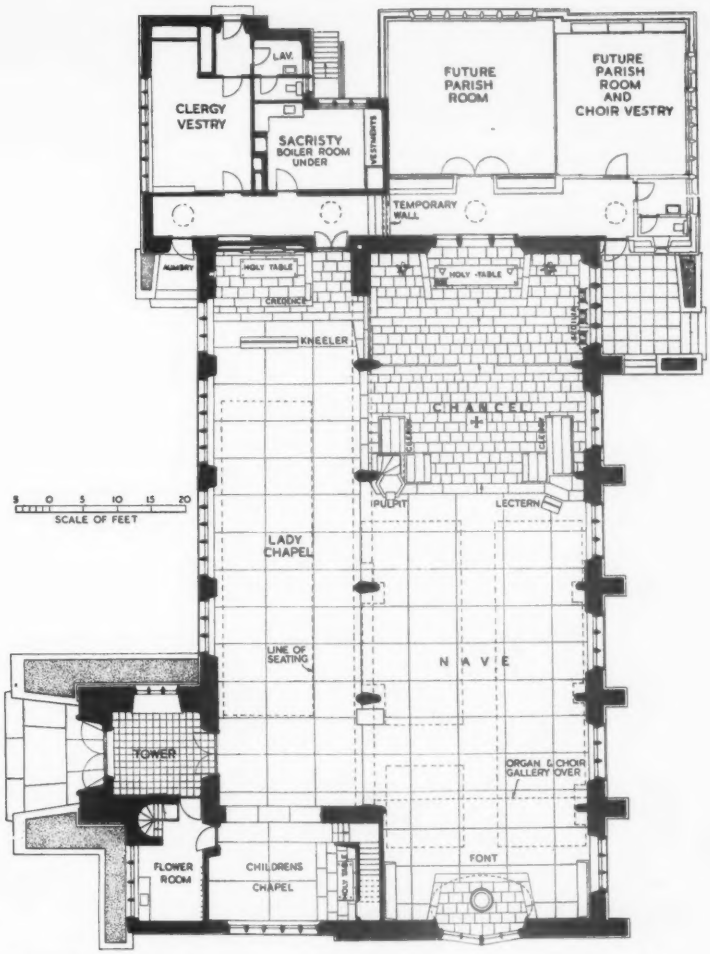
In designing the new church the decision was made to pull down the former building to plinth level and to build the new one on the original foundations but to use only that portion occupied by the former nave, leaving the part occupied by the old chancel and Lady chapel as the site for the parish rooms it was proposed to build in the future. In planning the new church the architects laid emphasis on a spacious chancel and sanctuary to allow dignified use of the traditional ceremonies of the Church of England.

The new church has been built in reinforced concrete portal frame construction, the concrete frames being cast in specially prepared moulds and left unplastered. The external facings are of buff-grey bricks with dressings of Hartham Park limestone. The internal lining to the nave has been carried out in plastered woodwool panels, but in certain positions the walls have been finished with acoustic tiles. The roof over the nave is covered with pantiles, and the concrete roof over the aisle containing the Lady chapel has been lined with 23 gauge copper laid with standing seams. Over the vestry and children's chapel the roofing is flat, and here natural rock asphalte has been used. Throughout the nave and Lady chapel the flooring has been carried out in Stonart; artificial stone paving has been used for the chancel, sanctuary and around the font.

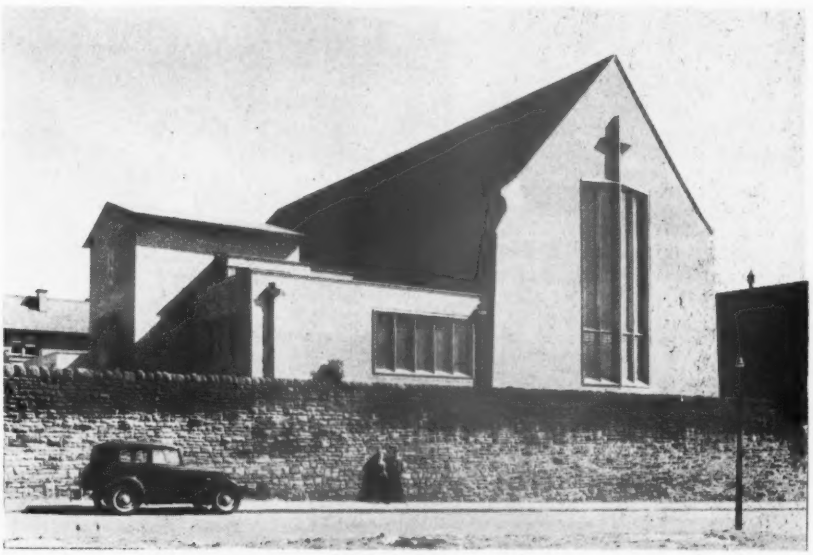
The church is warmed by a heating system embodied in the floor throughout the building, operated by an oil-fired boiler installed in the heating chamber of the former church. The electric lighting is at high level, the points being concealed behind the transverse ribs.

The stained glass window over the high altar was designed and executed by Mr. Christopher Webb.

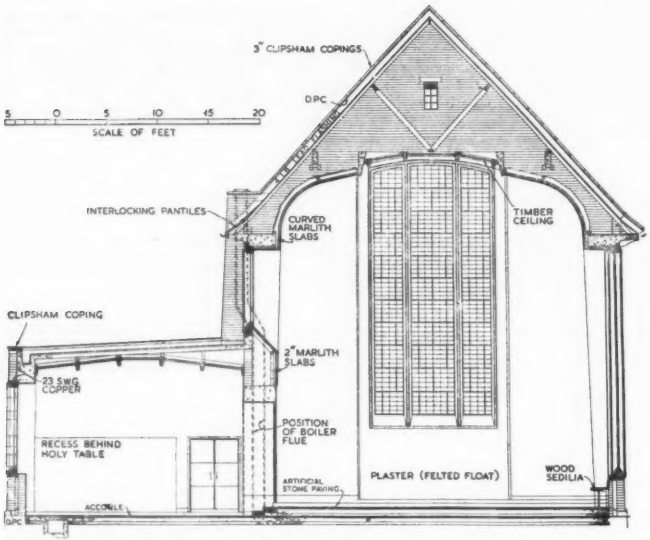
The tender, amounting to £39,000, was accepted in August 1951 and the church was dedicated in October 1953. A very substantial contribution towards the cost was awarded by the War Damage Commission.



Plan of the church and proposed parish rooms



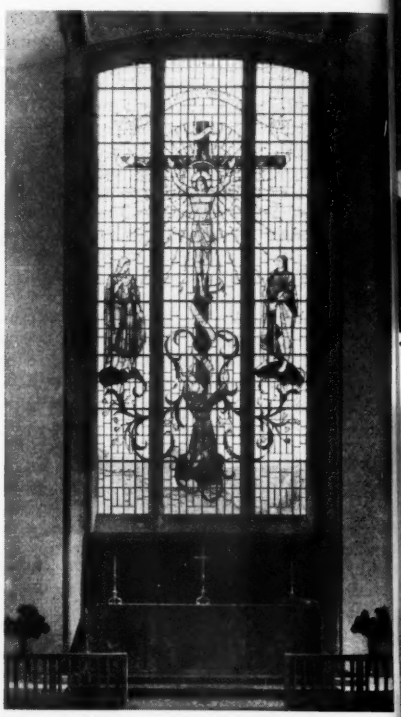
View of the west end showing the base of the tower on the left



Section through the nave and Lady chapel

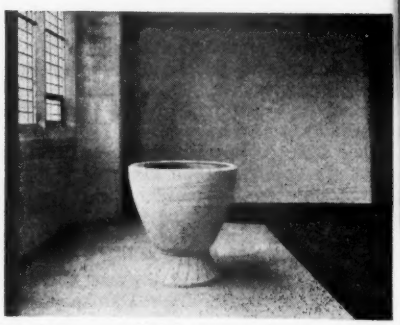
The porch under the future tower

The eastern end, showing the Lady chapel and base of tower



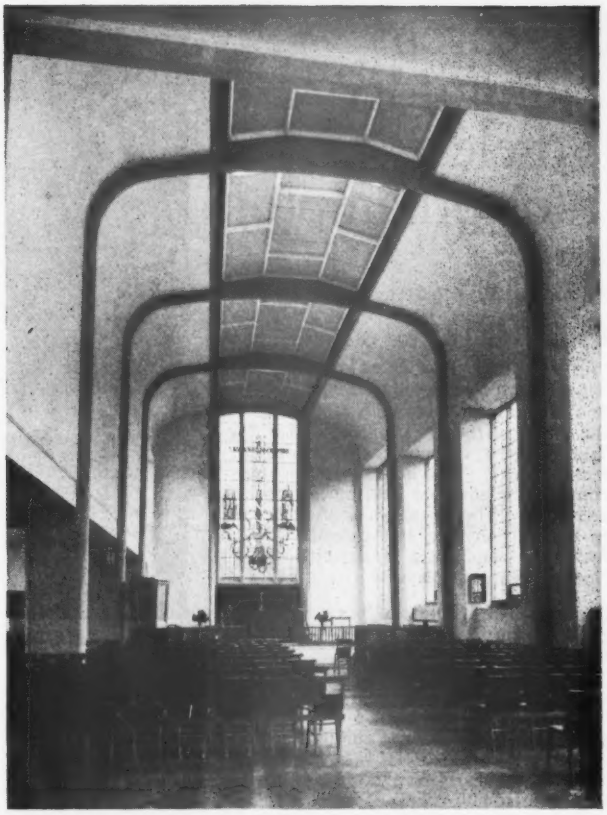
The stained glass east end window

General view of the north side

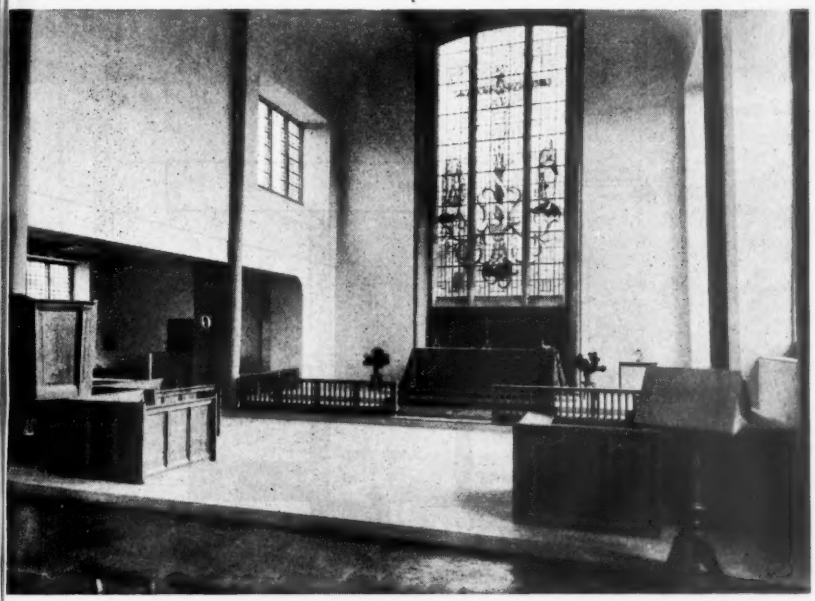


The font, on artificial stone paving

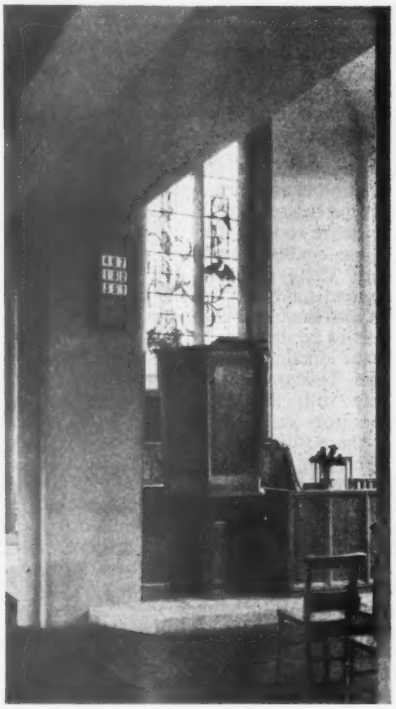
The altar and sedilia. The steps lead to the pulpit



General view of the nave, looking east, showing the portal frame construction



Above: the chancel and sanctuary, showing the pulpit on the left and the lectern on the right



Right: the pulpit and clergy stall. The paving is in artificial stone

Research Laboratory, Coseley, Wolverhampton

Architects: Lavender, Twentyman and Percy [*F*/*A*]

THIS BUILDING is situated on the main Birmingham–Wolverhampton arterial road and is the central research laboratory for the whole of the Guest, Keen and Nettlefold group of companies. There are four main blocks. The administration block contains the entrance hall, offices, canteen and library. There is also a conference hall, to seat 90 persons; this extends through two storeys and has a projection room for cinematograph displays.

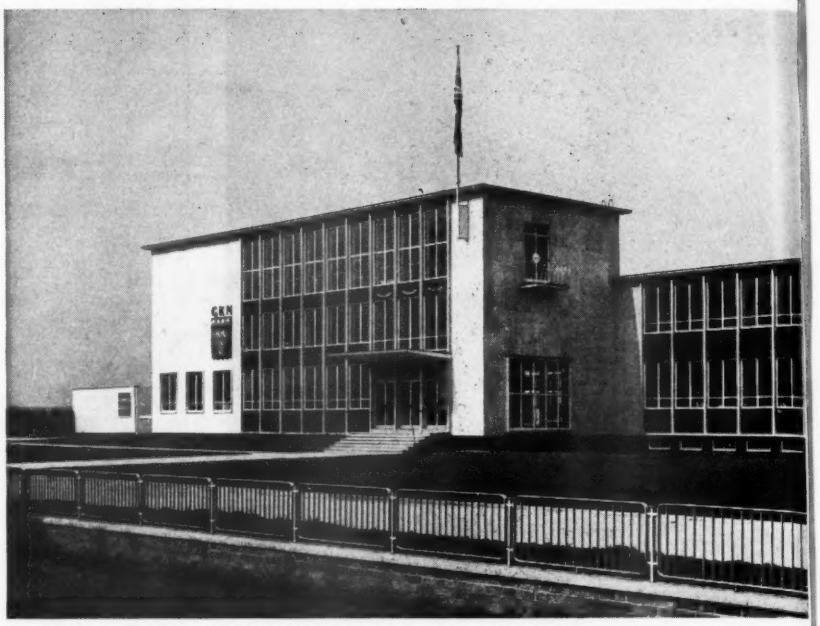
Planning. The laboratory block is planned with a central corridor between rooms 16 ft. wide, thus complying with the planning requirements for a large number of small laboratories, except in the chemistry department. A module of 5 ft. 7½ in. was adopted for the structural mullions and this allows for considerable variation in the siting of the partitions, both now and in the future, to give rooms of varying lengths.

A basement extends under the whole of this block and contains certain laboratories as well as dark-rooms and storage space. The stores block is centrally planned with access from the service yard, the first floor being given up to office accommodation. The workshop block is a single-storey building containing rooms where heavy machinery is installed or where noisy work is carried out.

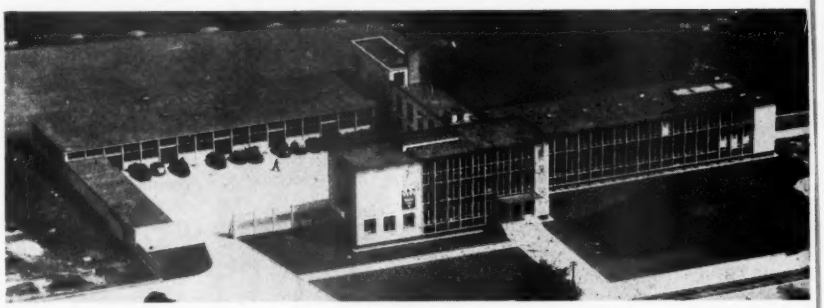
Construction. The general system of construction is monolithic reinforced concrete, and the reasons for this choice were partly the desire to save steel but mainly because its use enabled structural mullions to be used. These mullions not only gave the required module for placing the partitions but also enabled stanchions on the outside walls to be dispensed with; the installation of the ducting system was thereby facilitated. This system of construction also did away with the need for beams in the laboratory ceilings, making it much easier for the position of partitions to be altered.

The roofs and floors are of hollow tile construction, spanning generally from the outer walls to the corridor beams, but in the administration and stores block they rest internally on 6-in. concrete spine walls.

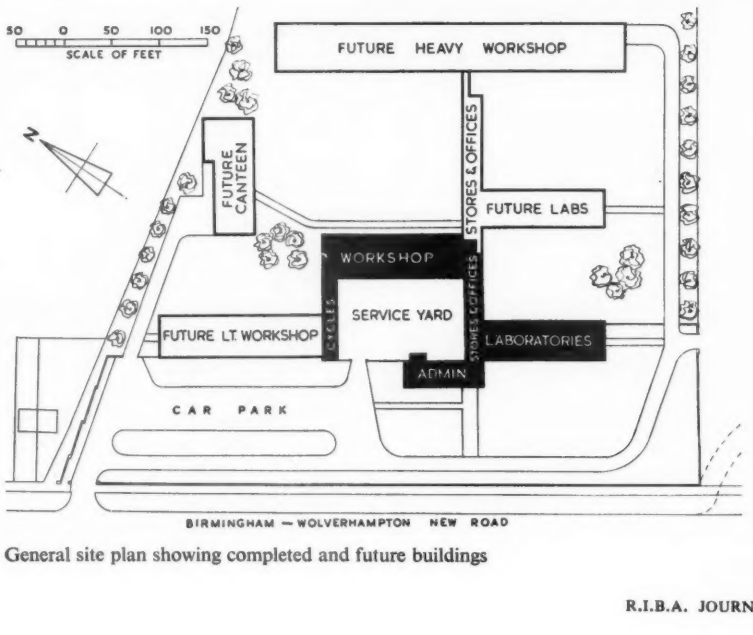
In the laboratory block there are reinforced concrete piers on each side of the central corridor; they are spaced at 16 ft. 10½ in. centres, that is, at three-module distances. The reinforced concrete structural mullions are 6 in. by 12 in. and are faced with 6 in. Portland stone



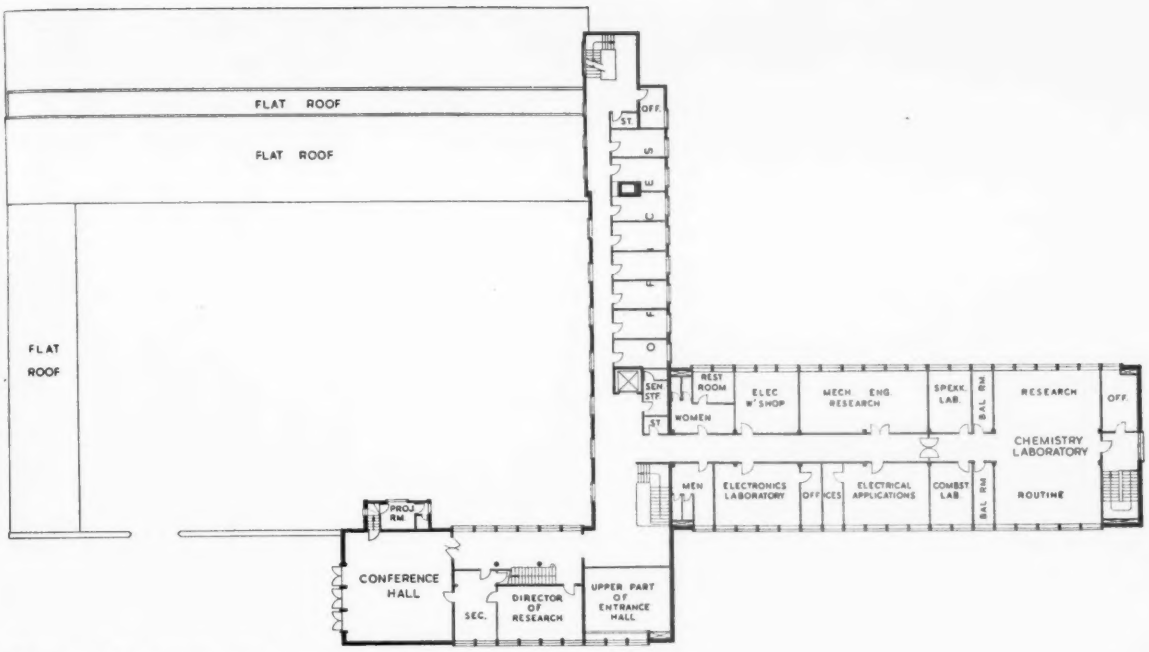
View of the administration block. The laboratories are on the right



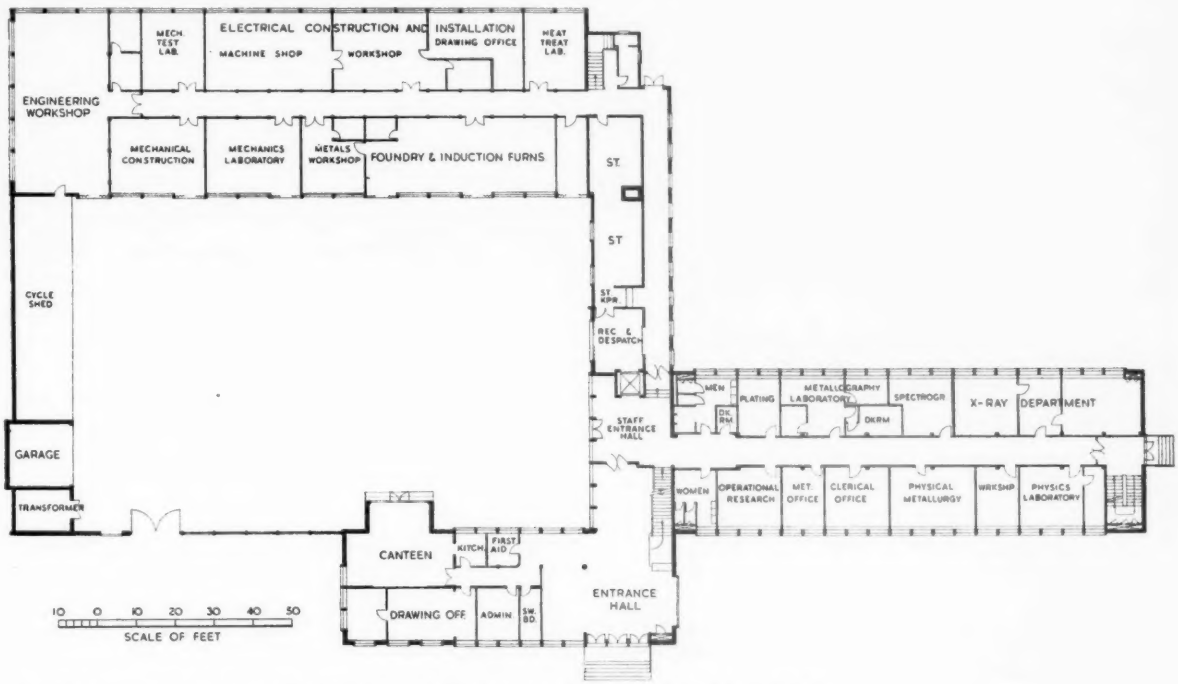
Aerial view of the laboratories



General site plan showing completed and future buildings



Plan of the first floor of the administrative and office blocks, and the laboratories

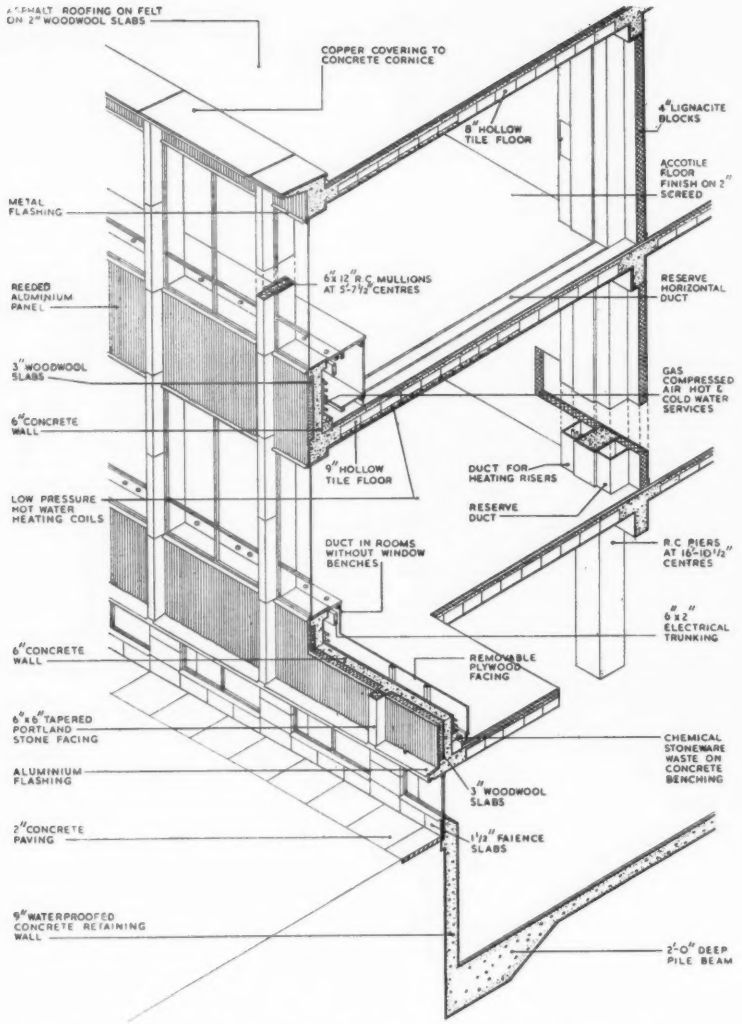


Plan of the ground floor of the administrative and office blocks, the laboratories and the workshop

tapered in plan. The stiffening ribs are similarly faced. The concrete walls below the windows are 6 in. thick, stiffened with ribs on the outside below each mullion, the space between the ribs being filled with 3-in. woodwool slabs which acted as permanent shuttering. The blank walls are 6 in. thick lined with 2-in. woodwool slabs. The plinth is faced with 1¼-in. brown faience slabs.

In the administration and laboratory blocks the blank walls are faced externally with 3-in. thick Portland stone slabs fixed to the concrete with bronze cramps and dowels. The top stones are held by dowels dropped through the concrete cornice. The stone externally and the woodwool internally were both used as permanent shuttering.

The spandrels above and below the windows are faced with reeded aluminium



Isometric drawing showing constructional details of the main laboratory block

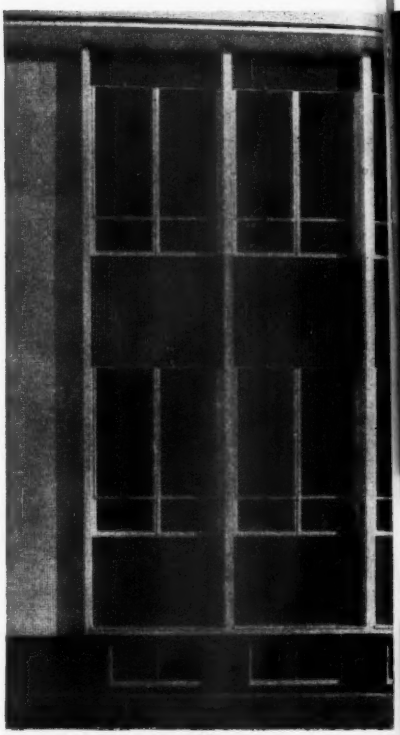
panels, painted dull blue. Battens were left in the concrete as a fixing for the panels, which have metal drips at top and bottom.

The single-storey workshop block is of light steel construction, the walls and roof being built with precast units.

Ducts. In laboratories, probably more than in any other type of building, the position of the service ducts is of great importance and may well be a determining factor in the design. In this G.K.N. laboratory the system of vertical ducts rising at intervals along the exterior walls was discarded as it was considered to be not sufficiently flexible and would interfere too much with the natural lighting of the smaller rooms. The idea of having vertical ducts on the corridor walls was also discarded as it would have meant increasing the width of the block. It would also have involved increasing the height of the building, as false ceilings or thicker floors would have been needed to house the service connections to the benches under the windows. All this, of course, would have increased the cost.

The system adopted consists of four vertical ducts, one at each corner of the block, and as two rise in lavatories, the third in the X-ray department on the ground floor and an office on the first floor, and the fourth in the staircase well, they occupy the least valuable space. From these vertical ducts horizontal ducts run along the outer walls below sill level; they are 9½ in. wide by 2 ft. 10 in. high, and as there are no stanchions to obstruct the run of the pipes they take up very little room. The services generally have actual or blanked-off connections every 11 ft. 3 in. along the ducts.

In addition to the four main vertical ducts smaller ones, 10 in. by 8 in., rise on each side of the corridor piers. Half of them are used to contain the heating pipes and the others are left as a reserve to cater for any new service that may be required in the future.



Detail of laboratory walling

This system of ducting would not be appropriate for laboratories where drainage from island benches on upper floors is required, but in this laboratory the only island benches are in the chemistry department and these do not need drainage as all sinks are in benches along the walls.

External and Internal Finishes. The external finish to the concrete walls of the stores block is smooth; it was done with a carborundum stone and the walls were then painted. The roofs have been finished with asphalt on woodwool insulation. Painted aluminium was used to cover the soffite and edges of the concrete canopy over the main entrance, the soffite being reeded.

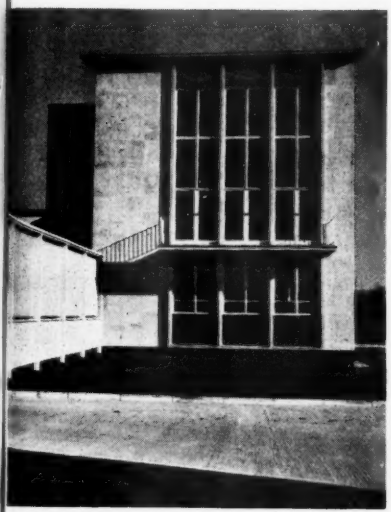
The internal finishes are as follows: in the administration block the entrance hall, which extends through two storeys, is paved with green terrazzo tiles on the ground floor and with cork tiles on the landing. The walls round the staircase are faced with travertine; other walls are either faced with mahogany panelling or are painted. The ceiling is formed with acoustic material. The stairs are done in white terrazzo with a mahogany handrail.

The stairs leading to the library are in mahogany with cork treads; the wall by the stairs and the spandrel wall have been finished with mahogany-faced blockboard and the ceiling with sycamore-faced plywood. Floors throughout this part of the building are in cork tiles. The adjustable shelving in the library is of mahogany.

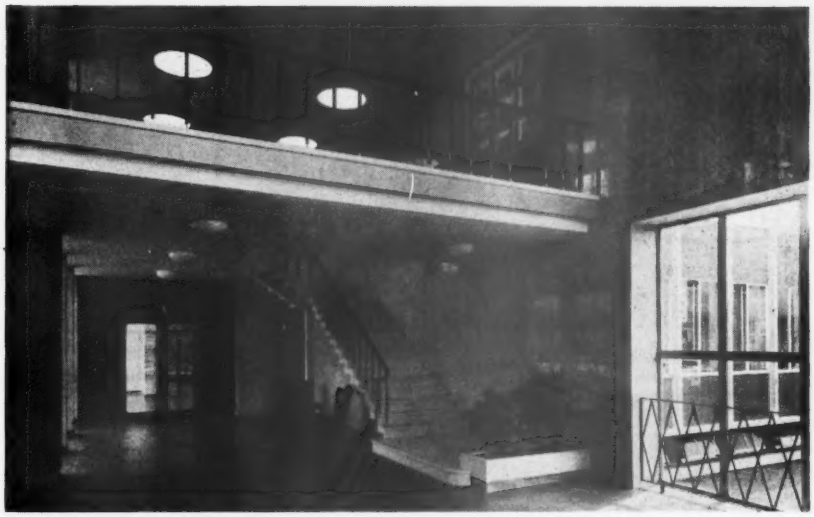
In the laboratory block the floor in the chemistry department is finished with teak blocks, elsewhere the floors generally are

Above: lobby to conference room

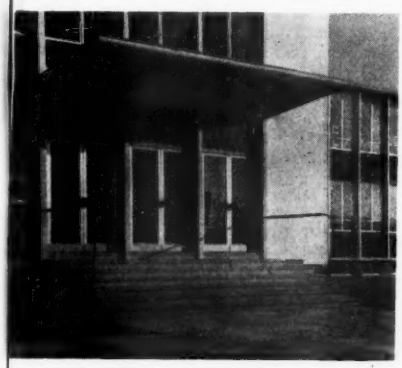
Right: the library



North elevation of administrative block, showing conference hall windows



The entrance hall and staircase



Detail of main entrance

of grey asphalt tiles. Painted plaster forms the finish to the walls of the chemistry department, the corridors, offices and lavatories, and the rest of the laboratories have walls distempered direct on the lightweight concrete block partitions. The ceilings are plastered. The staircases are in terrazzo with painted iron balustrades.

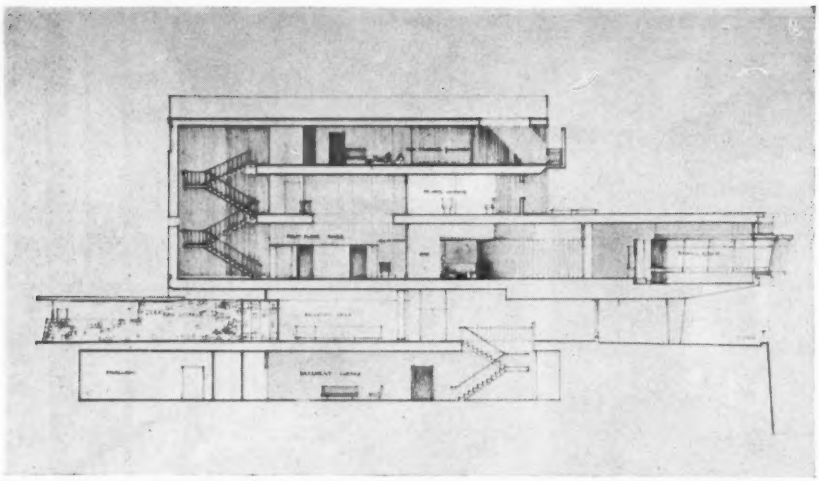
Laboratory services. The services include gas, compressed air, and hot and cold water, the latter being supplied from storage tanks in order to avoid fluctuations in pressure. Chemical earthenware has been used for all laboratory drainage.

Electrical current is supplied at 210-volt single-phase and 400-volt three-phase. There are also terminal boards supplying direct current up to 110 volts in 2-volt stages; this comes from storage batteries in the basement, and by means of a central exchange board it is possible for rooms on this D.C. system to be interconnected.

Heating. Heating is by low-pressure hot water supplied from oil-fired boilers. Radiators are used in the workshop block; elsewhere invisible panels are installed in the ceilings or, in a few instances, the floor.

The conference hall is warmed and ventilated by the plenum system, the inlet machinery being placed under the projection room and the extract machinery on the roof.

Acknowledgments are due to THE ARCHITECT AND BUILDING NEWS for some of the photographs.

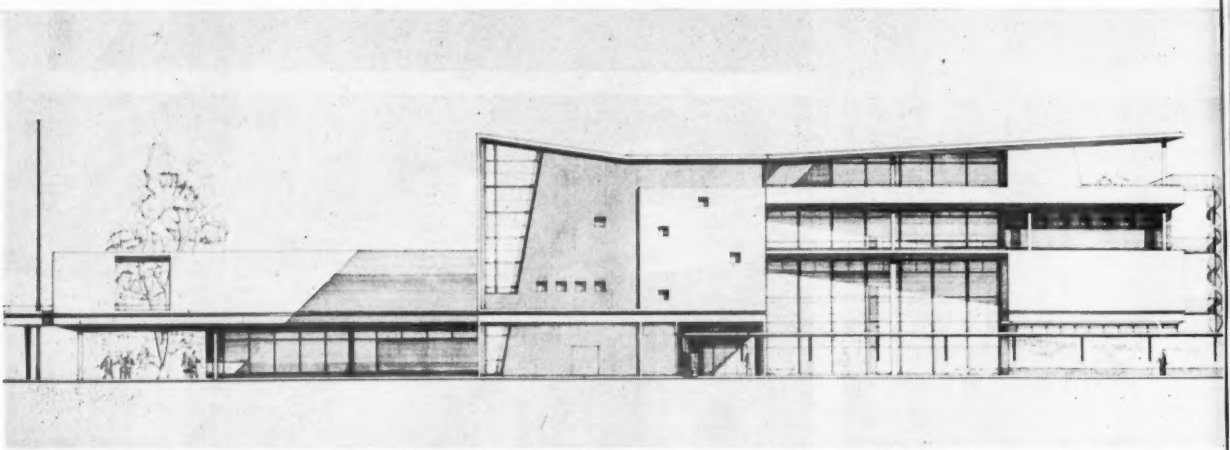


The cross-section showing the basement lounge, largely open ground floor, projecting dining-room and two-storeyed hall

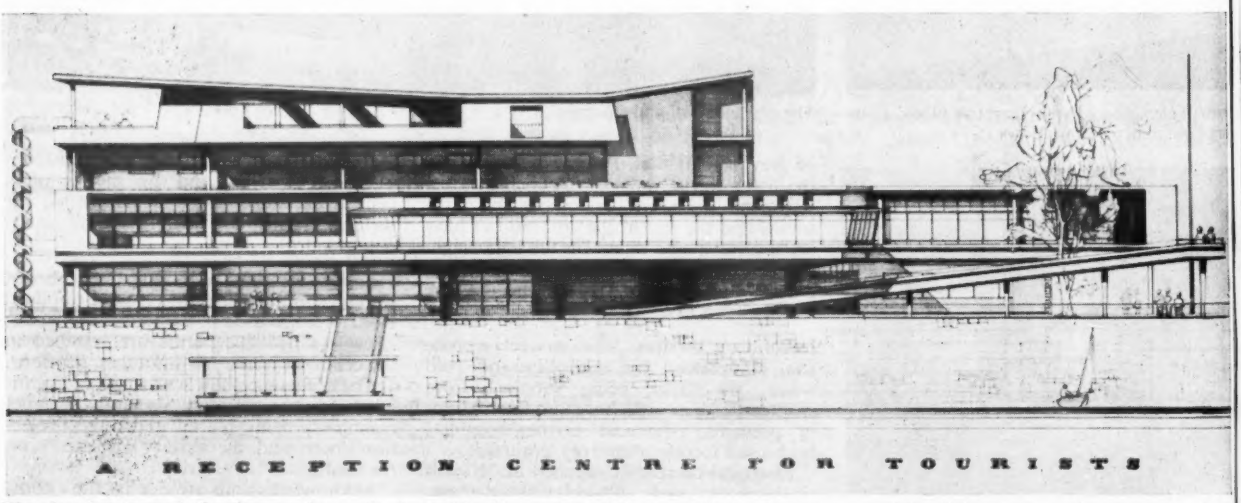
The Rome Scholarship in Architecture, 1954

WE ILLUSTRATE the winning design by Mr. G. I. Lacey, B.Arch. (L'pool). Mr. Lacey is 27 years of age and a post-graduate student in the Department of Civic Design at the University of Liverpool.

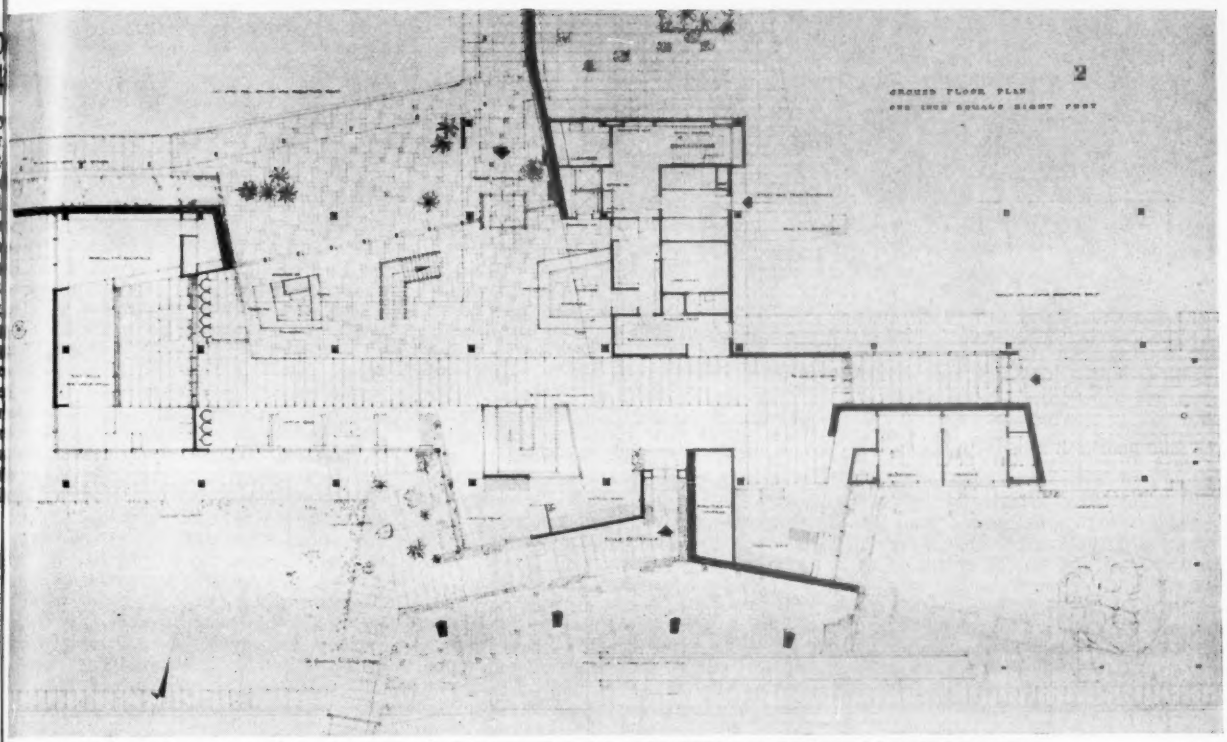
The subject is a reception centre for Scandinavian tourists on the banks of a tidal river in Britain. They are to arrive by fast motor launches from the steamers. The building is to provide postal, banking, exchange and information facilities along with travel and entertainment booking offices. Clubroom and dining facilities are to be provided and a few bedrooms for late arrivals. The centre will act as a station for coach tours and serve as a social centre for the visitors. The site, which is backed by a roadway and mediaeval city wall, is of limited extent so that a building on several floors is necessary.



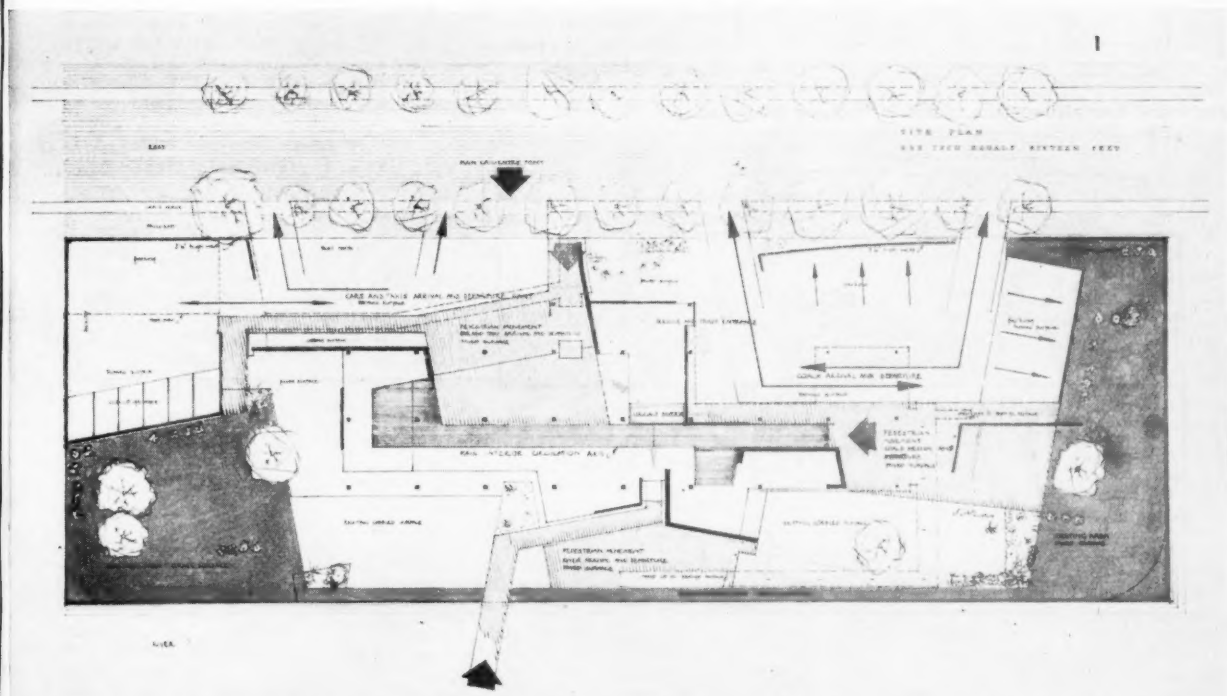
The elevation towards the road and mediaeval city wall. Coach arrival and departure is under cover on the left, car and taxi arrival and departure on the right and pedestrian access in the centre



The elevation towards the river on the south. A considerable portion of the ground floor is on columns. The dining-room projects over the river terrace

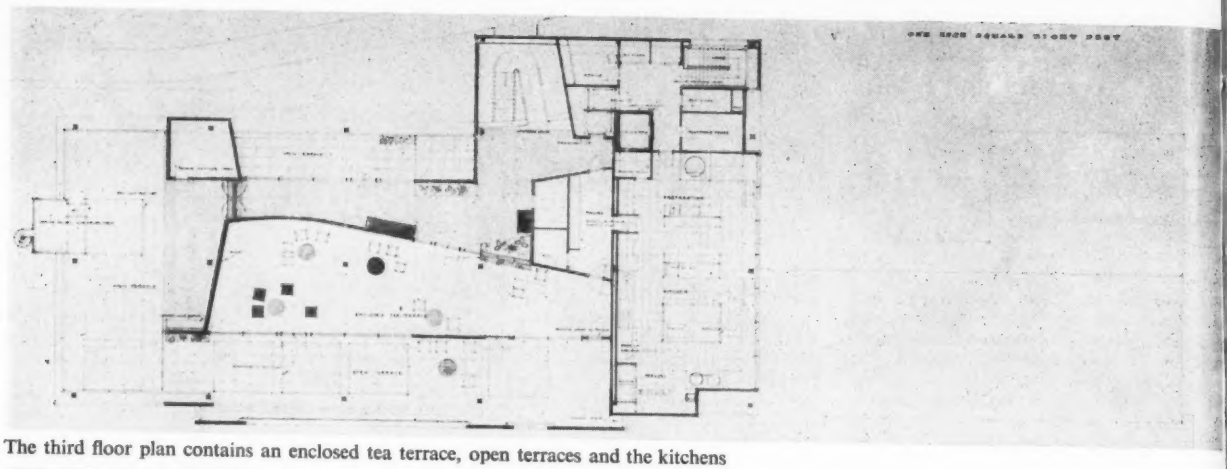


The ground floor plan contains the main entrance hall, information and similar facilities and offices of the administration

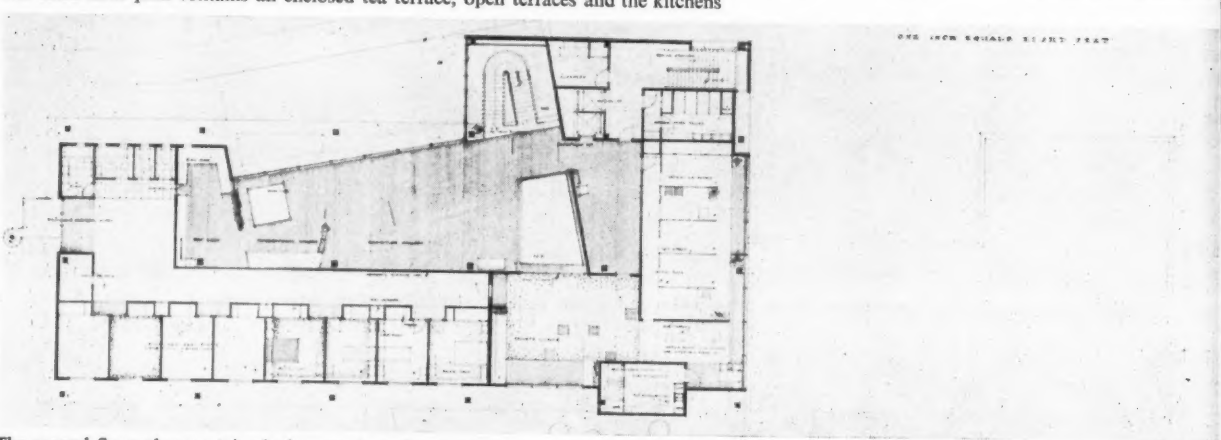


A RECEPTION CENTRE FOR TOURISTS

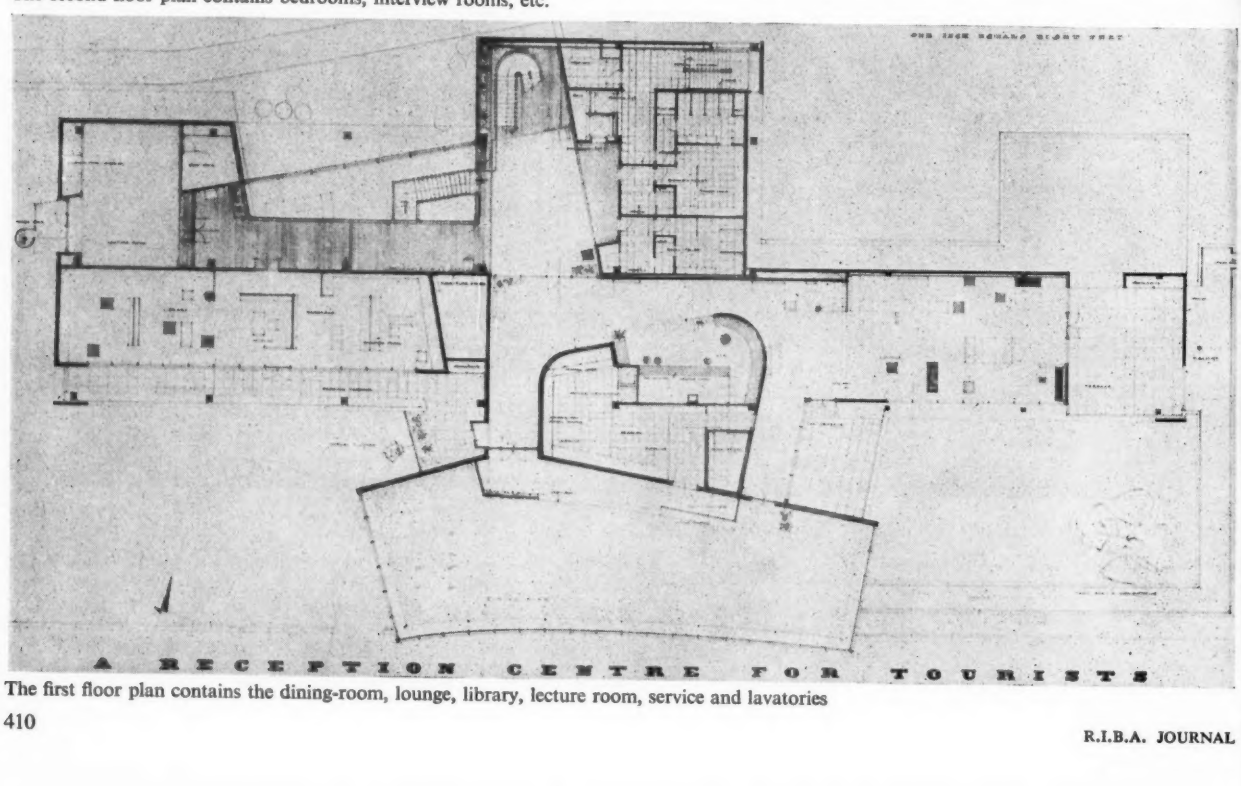
The site plan shows mainly the arrival and departure routes by river, coach, taxi and on foot. These are connected by a central pedestrian way



The third floor plan contains an enclosed tea terrace, open terraces and the kitchens



The second floor plan contains bedrooms, interview rooms, etc.



The first floor plan contains the dining-room, lounge, library, lecture room, service and lavatories

Insect Infestation of Churches

By A. W. McKenny Hughes

Principal Scientific Officer, British Museum (Natural History)

Read at a Conference of the Historic Churches Preservation Trust, 4 June 1954

MOST PEOPLE, I believe, on seeing the title of this talk will immediately think of the wood-boring beetles, and quite rightly too as they are by far the most important pests in churches, so let me deal with them first.

Wood-boring Beetles. The most serious of these is the Death Watch Beetle, or, to give it its scientific name, *Xestobium rufovillosum*. This sinister insect conjures up visions in most people's minds of tremendous and rapid damage that can cost thousands of pounds to repair. This is not an exact picture, as the amount of damage done can vary enormously, depending on the condition of the timber attacked. For instance, growth will be very rapid, comparatively speaking, in really rotten woodwork. In the roof of the Beckett Chapel of Thaxted Church the adult beetles had bored through the lead, thus making many smallish holes where water had seeped through for several years. The wood planking below was so rotten that in many places it was like a sort of dark brown putty. I have never seen so many Death Watch Beetle grubs to the square inch as when this was broken up. There were grubs of all sizes and a few adults as well, the wet, warm, fungusy, ill-ventilated woodwork being precisely what they liked best.

On the other hand, you may get timbers where just one or two beetles emerge from time to time and the damage is very slight and deterioration very slow, and the infestation may die out of its own accord. Alas! This cannot be counted upon and conditions may change so that what was a slow progression covering many years suddenly gets a new stimulus and flares up into an alarming outbreak. The presence of Death Watch Beetles can never be looked upon with complacency, but it need not, in all instances, cast such a shadow of alarm and despondency as seems to cloud the minds of many people when they are told, or perhaps have merely guessed, possibly wrongly, that a Death Watch Beetle has been found in or near a church. One has got to be very realistic about the whole business and to find out as soon as possible if there is in fact any damage by this pest—or if not by Death Watch Beetle by any other insect—the extent and the cost of repair of such damage, and prevention so far as possible of its recurrence. There is some basis for the fear when Death Watch Beetle is suggested that a poor and scattered parish may find itself faced with a four-figure bill for repairs to some magnificent church—the legacy of a more prosperous age in their neighbourhood.

So we come back to inspection, and the person responsible for this should know the life history in all its quirks and twists. I will not bore you with a long technical discussion on this matter, but will give the bare bones of it, so to speak.

Life History of the Death Watch Beetle. First, the eggs are whitish and lemon shaped, about 0·6 mm. or 0·7 mm. in length. They are mostly laid in the daytime, usually in twos and threes in cracks and crevices, but occasionally some particularly attractive spot may contain quite a lot, and a female will lay an average of about 70 in a lifetime of ten weeks or so. The eggs hatch in from two to eight weeks and the larvae that emerge are quite small and white. As a rule they crawl over the surface for some time before finding a suitable site in which to enter the wood, though they may eat their way in through the egg shell. The eggs are very difficult to find; at least, I have seldom found them myself nor have I ever seen young larvae moving on the outside of the timber on their site-finding jaunt. From the time the larva enters the wood to the time the adult emerges many years may have passed; this is nearly always as long as three, but ten or more years is not uncommon. It depends on many factors, but the texture and condition of the wood are one of the most potent. As the grub grows it increases in size and its burrow becomes correspondingly larger. When in the fullness of time it has become what is technically and suggestively known as full-fed, it burrows towards the surface of the timber in which it has been feeding and excavates a cell in which to pupate, that is, to change into a pupa or chrysalis. This resting or transformation stage is quite short, a matter of weeks, seldom more than a month, and then the adult emerges from the pupa and remains in the pupal cell till the following spring.

The adult emerges in April and May, sometimes a little earlier or later. It is a brownish beetle, rather straight-sided, with yellowish hairs scattered over the body in fresh specimens, but later these hairs are liable to get rubbed off. The beetles are about 7 mm. or 8 mm. long. I have never heard the ticking noise made by Death Watch Beetles, but I am a little deaf; many people have heard it. I am told it is like a pencil tapping a piece of wood seven or eight times to the second and then stopping. Both sexes can do this, but it is usually the male that starts the calling and the female sometimes responds. The holes made in the wood are exit holes only, sometimes called flight holes, and they vary in size according to whether the beetle was large or small; the average diameter is about one-eighth of an inch.

Is the Infestation Active or Inactive? There are many indications to show if an infestation is active. When beetles have just emerged—and this point applies to all the wood-boring beetles—the holes are clean inside, but later they become darkened by dust and soot. Live beetles may be found crawling on the woodwork, on the window sills, on the floor of the church or in the pews. They often sham death, but usually if you pick them up in a warm hand they will soon discard the deceit and try to run away. There is a school of thought that postulates that it is important to see where the beetles are situated on the floor of the church so as to correlate this with the roof. My own view is that since Death Watch Beetles can both fly and crawl, and in any event wish to meet the opposite sex after they have emerged from the woodwork, too much reliance should not be placed on the actual position in which they are found. Look in cobwebs to see if any beetles have got caught up in them; if small piles of dust habitually form under beams there is a presumption that something is going on inside, but if a beam is tapped (as with a hammer) or shaken (as by a heavy vehicle passing outside) and dust pours out from various places at the same time, this may be only the sign of old damage in which all activity has ceased, perhaps many years ago.

What I am trying to emphasise is that dust coming from a beam, if you disturb it, does not necessarily, as some people assume, mean a heavy infestation by Death Watch Beetles. The droppings of the Death Watch Beetle are bun-shaped, and thus quite different from those of any of the other wood-boring beetles, so the dust thrown out of the timber attacked by this insect would consist of wood debris and these bun-shaped particles. This is sometimes helpful if you are not certain which insect is involved.

Where to Look for Death Watch Beetles. Having now suggested how to recognise active infestation, where should one look if asked to inspect a church? I think I should answer: start with the wall plates—more especially if you see any signs of damp on the wall below—the main roof timbers, purlins, rafters and ridge. After that panelling, floor, screen, choir stalls and so on. Do not forget also to look all around the church outside; you may often find some signs of damp which might escape you inside, or some slight settlement that may be a useful clue. Examine the guttering and the downpipes to see that the water can

get away and is carried clear of the church. Of the timber itself, sapwood is usually attacked first and may even be eaten away entirely, leaving a sort of honeycomb of little structural value. Where branches have been cut off the main trunk of the tree, and around knots, are other favourite places. Quite often the entire centre of the trunk has been damaged, leaving the outside intact.

The Death Watch Beetle mostly attacks hardwoods, especially oak, but it can also thrive in old coniferous timbers. In Northleach church, for instance, the floor is of deal blocks and this has been riddled with exit holes in one area, where presumably the floor was damp.

When all this is said, it is up to the architect to decide whether a particular beam will still carry the load. Happily our ancestors usually over-insured by using far heavier beams than would be thought necessary today, and a great deal can be scraped off before the timber is dangerously weakened. Some architects are, or so it seems to me, apparently ignorant of the habits of the Death Watch Beetle and are apt to condemn timber which was once attacked, though the damage is to a large extent superficial and in any event died out a few hundred years ago. To them I would say: 'Remember that the beams you wish to remove have stood for hundreds of years and are likely to remain sound for many years to come, are some of the finest timber in the country and are unlikely, to say the least, to be replaced in present circumstances by anything approaching their quality, and that we just have not the money to squander in this way. If in doubt—it is a tricky problem anyway—do not be proud, get an expert to advise you and be sure he is an impartial expert and not the agent for some nostrum.'

The Common Furniture Beetle, *Anobium punctatum.* This insect is much smaller than the Death Watch Beetle, so that its exit holes will also be smaller. On the average they are about half the size, probably seldom bigger than 1/16 in.; they too vary in size enormously. They can attack almost any sort of timber. The life cycle is much shorter as a rule. From two to three years seems common, but they too can extend this period if conditions are unfavourable; the period is probably about two years in old furniture. The eggs are oval and white, 0·65 mm. long, and the female lays about 40. The grubs are also correspondingly smaller and the pellets ejected by them are granular and oval, not bun-shaped. This beetle also differs from its larger confrère in making the pupal cell in the early summer, not in the autumn; there it remains as a chrysalis for two or three weeks only and the adult emerges in late May, June, July and August. The beetle itself is hooded and has rows of punctures on the wing cases.

The Common Furniture Beetle also can cause structural collapse. It can, and indeed does, destroy certain pieces of wood completely, but the process is usually, though not always, slow, and in this event obviously no reasonable steps have been taken to check its ravages. As its name denotes, it is just as often found in furniture, pews, desks, screens, etc., as in the fabric, perhaps even more so.

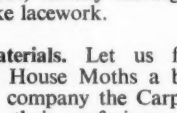
The Powder Post Beetles, *Lyctus spp.* These are all roughly the same size as the Common Furniture Beetle or perhaps a little larger, with the same variations, but their length is much greater than their breadth. They are straight-sided and less domed, so they appear much larger. They attack hardwoods only, never coniferous timber, and then only sapwood. The eggs are white and cylindrical, somewhat shiny, about 0·8 mm. long and 0·2 mm. wide. The grub is white, about the size of the Common Furniture Beetle, but it can be distinguished from it since the last breathing aperture near the tail is nearly four times as wide as the others. The burrows follow the grain of the wood and are filled with fine creamy-white flour-like dust which the creature evacuates, hence the name Powder Post Beetles. The life cycle appears to be about a year, sometimes slightly less, but it too can be prolonged. It is much more of a pest of new timber and very unlikely to be active in churches where the woodwork is many years old, though you often see signs of old damage.

The House Longhorn Beetle, *Hylotrupes bajulus.* I feel I ought to mention this insect, even if you will not find it in our old oak-built churches. It has been noted in some of the churches dating from William and Mary or Queen Anne. Where you find coniferous timbers used for the structure there has often been an attack by this insect. Happily it has often died out, but in a few instances there are signs of activity, possibly from recent infestation or reinfestation, and there the utmost care should be taken to eradicate it since it is a particularly dangerous beast. It has been active in the secular field in Surrey and sporadically in some other counties. If coniferous timber is introduced into churches for repair, remember that this creature exists and keep an eye open. The exit holes are oval, quite large, about ¼ in. long. The life cycle is very long, from three to eleven years or more, and the females are prolific egg layers, anything from 40 to 300. The damage is often difficult to see, as the wood may be eaten away inside without much visible sign, and it is only when you touch it that the thin outer crust gives way and it dissolves into a shower of powder. You may say it is unlikely in churches; relatively speaking so it is, but it is better to be safe than sorry.

Books and Registers. Now let us turn for a moment to an entirely different phase of our subject, the damage to books, registers and papers. Some churches have valuable libraries, others merely keep a register or two in the vestry, but in either event they contain information of value and as such should be protected. It is surprising, when you go into the matter, what a lot of insects can damage books. There is the Death Watch Beetle. Only the other day I had a grub sent in to me which had been eating its way through a 16th-century book of Latin commentaries. The beetle had obviously entered from below, or in other words out of the shelf on which the book rested; when the dust was examined, there, sure enough, were the bun-shaped droppings. Do not, by the way, mistake these for eggs. Many people do so with corresponding alarm. Next, the Common Furniture Beetle can contribute its quota of damage and there is, I believe, a bookworm proper called *Anobium hirtum*, only I have never seen it! Some spider beetles can gnaw bits out of leather bindings, usually at the base of the spine or back, and the Drug Store Beetle attacks cloth binding as well as leather.

There are probably other beetles that can and do occasionally cause trouble, but let us leave them and consider the other insects. Clothes and House Moths can ruin bindings and sometimes eat through the pages as well. The other day I was shown some marbled calf bindings eaten away on the outside, with curious little hesitating galleries emerging from a central patch of damage. I decided it was the work of clothes moth caterpillars, as there was just a wisp of silk left on one volume and a tiny bit of brown dirt attached. I was almost delighted when I found a similar binding in my own library attacked in a like way, only this time the culprit was busy at work and I was able to identify it without any question. Cockroaches make a blotchy attack on cloth-covered books, presumably enjoying the paste. I have never been certain if they attack leather, though this seems probable with such omnivorous feeders. The Silver Fish attacks certain types of paper, usually leaving it fretted somewhat like lacework.

Woollen Materials. Let us follow the Clothes and House Moths a bit farther, add to their company the Carpet Beetles, and watch their nefarious career as destroyers of woollen materials. It is quite surprising, when you come to think of it, how much can be damaged in a church with which, in this sense, one somehow does not associate wool. Cassocks are, I am told, often made of wool. Hassocks may be covered with it. You may sit on it in your pew. You may walk on it when you are married. You may be covered by it when you die! There are curtains, tapestries, cushion covers, and carpets all liable to attack if made wholly or in part of wool. Quite often you will find the wool eaten away and other materials like silk or rayon left untouched where mixtures of these materials have been used. There is one exception to this rule; other materials can



be damaged where the moth pupates. Before performing this operation, it spins a silken cocoon on the outside of which it incorporates bits and pieces of the material adjacent. Frequently this will consist of small fragments of a substance which is totally inedible to the caterpillar. For instance, I have seen silver paper shredded and woven into a cocoon; or, again, some rayon-covered quilts were folded up for storage and a few common Clothes Moths decided that was a comfortable place to pupate and bit pieces out of the rayon. The quilt manufacturers were as incensed as if the larvae had eaten the quilts; from their point of view the result was the same.

Control Measures. Let us now consider the control measures for the different insects about which I have been talking. First, as a general precaution may I suggest the removal of all old junk. So often one finds some 'glory hole' filled with old and useless articles often broken beyond repair. It may only be a cupboard in the vestry, full of odds and ends, but I have seen more spacious accommodation, such as parts of crypts, used in this way. Obviously all such places should be inspected to see if anything of value has strayed there which can be restored to its former beauty and place, but for the rest I should get rid of it before it becomes infested with one sort of insect or another and acts as a reservoir of infection for the whole building.

The Wood-boring Beetles. Various chemicals are now used to destroy the wood-boring beetles. Pentachlorphenols and pentachlorphenates, the metallic naphthenates and so forth. Some of the older remedies like orthodichlorobenzene should be avoided as the vapour is toxic to human beings. Some of the post-war residual insecticides, e.g. those that leave a residue on the treated material which will kill the insect that comes in contact with it rather than vice versa, have been used, but in the treatment of 'woodworm' not very successfully as a rule when used alone. New insecticides are constantly being produced and advocated for the destruction of the wood-boring beetles, and new techniques for using them evolved. They should not, however, be recommended until their usefulness has been established.

New methods of treatment are in the experimental stage, but they are not yet developed sufficiently to do more than note for future reference. Application of the chosen insecticide is all important. Woodwork to be treated should be thoroughly cleaned. All soft spongy wood should be scraped back to the hard core before using the insecticide, as otherwise it soaks up a great deal of liquid without doing any good. A paint brush is an excellent medium where you can use it, but obviously when a large roof has to be treated it is not economic to do it all by hand and some form of spray should be used. Some people like high-pressure sprayers, but in my opinion the liquid is liable to bounce off and much will be lost, so it is not economical. Injecting insecticide under high pressure into joints or specially bored holes also appears to me to fail in its object as so much usually comes out elsewhere or 'blows back' and is lost. I myself prefer more gentle methods; to use a low-pressure sprayer with a fairly coarse nozzle and then to let the insecticide seep in gradually as far as possible, with a brush for fancy work.

Then there is the thoroughness with which the job is done; on this so often depends success or failure. A conscientious operator is worth his weight in gold, and even he may fail if some of the damaged woodwork is inaccessible and has not been opened up for treatment. It is often a hard decision to remove cornices, ceilings and so on, at great expense, in case there is damage behind, but if there is suspicion of such a state of affairs it is usually worth while. Even if the woodwork so exposed turns out to be unaffected you at any rate know that it is so and a record to that effect with the date should be kept for future reference. It would also be prudent to treat the woodwork whilst it is exposed to prevent infestation later on, since the extra cost would not be great. It is also well to note exactly what treatment has been given, where, and when, so that later inspections can check the result of such treatment and in any event the worst areas can then be kept under observation.

With regard especially to the Death Watch Beetle, it is totally wrong to claim that it can be eradicated by one treatment only. Owing to the length of its life cycle, it would be incredible luck to succeed. A more conservative procedure, generally speaking, is to give a full-scale treatment in the first year, less in the second year and finally in the third year to give special attention to the most seriously affected areas. Two further years' inspection should follow to be quite sure the work has been effectively carried out and that there is no further recurrence of the beetle.

Protection of Books and Papers. Books will not be attacked if they are in constant use. Never overfill shelves so that the books are tightly pressed together. If you do, it gives the insects a much better chance of causing damage, either by entering from the sides of the bookcase or climbing up between the volumes. Take care that the bookcases and shelves are free from woodworm. If books or papers are attacked, they can be fumigated in air-tight chests or boxes, placing with them 1 lb. of paradichlorobenzene crystals to every 10 cu. ft. of air space and leaving them there for at least a fortnight; it is better to do this at a temperature of 70° F., but in any case it should not be done below 60° F. as the operation depends on the concentration of vapour amongst other factors, and at lower temperatures it is often insufficient to kill the insects. Try to ensure that there are no collections of debris, fluff, etc., in corners, cracks and crevices. They can be a breeding-ground for many of the pests. A vacuum cleaner, where it is available, is very helpful in removing this rubbish.

Protection of Woollen Materials. There is one certain way in which you can ensure immunity from attack by insects and that is to use wool that has been moth-proofed. Carpets can now be bought which have been treated in the dye-bath and the processes now evolved are claimed to protect the articles against attack and to allow dry cleaning or washing subsequently without destroying their immunity. That is all very well, you may say, but what about existing materials? They, too, can be protected by thorough spraying with laurylpentachlorphenate as the basic chemical, but they are not so stable as the treatment in manufacture, and washing and dry cleaning subsequently might be deleterious. There are other chemicals in this group which may prove more efficient. In any event such treatment is best left to firms who specialise in this type of work. Paradichlorobenzene crystals used at the same rate as for books (1 lb. to 10 cu. ft. of air space) in reasonably air-tight containers such as chests, drawers, etc., will protect woollen materials, but as the crystals vaporise away they must be renewed from time to time. Adhesive tape and strip gummed paper are useful sometimes for making leaky containers air tight. Materials so stored will retain the smell for a time, but hanging them out in the wind soon dispels it. But remember that once out of the vapour they are no longer protected. Do not just put them away somewhere else and forget all about them or you may find that the moth or beetle has been busy. Some of the cleaning firms moth-proof garments at an extra cost when sent for dry cleaning should this be requested.

Conclusion. In your inspections of churches, the pests you are most likely to find are Death Watch and Common Furniture Beetles, but do not forget the others I have mentioned and keep your eyes open for them. Do not think because there are holes in the beams the pest is necessarily active, and beware of removing timber, though it may once have been attacked, if it is structurally sound. There have been quite a few instances of this and small villages are sometimes confronted with estimates for hundreds of pounds which should never have been made. When we spend let it be wisely and well.

Review of Construction and Materials

This section gives technical and general information. The following bodies deal with specialised branches of research and will willingly answer inquiries.

The Director, The Building Research Station, Garston, near Watford, Herts. Telephone: Garston 2246.

The Officer-in-charge, The Building Research Station Scottish Laboratory, Thorntonhall, near Glasgow. Telephone: Busby 1171.

The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks. Telephone: Princes Risborough 101.

*The Director, The British Standards Institution, 2 Park Street, London, W.*1. *Telephone: Mayfair* 9000.

*The Director, The Building Centre, 26 Store Street, Tottenham Court Road, London, W.C.*1. *Telephone: Museum* 5400 (10 *lines*).

*The Director, The Scottish Building Centre, 425–7 Sauchiehall Street, Glasgow, C.*2. *Telephone: Douglas* 0372.

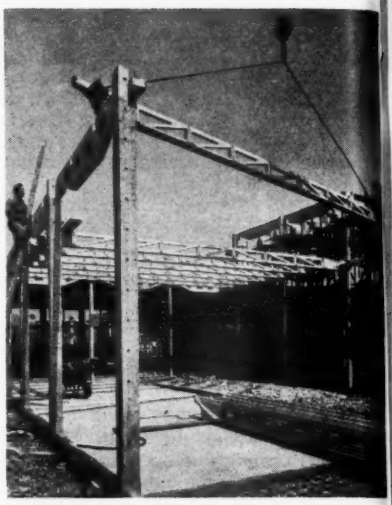
The Intergrid System of Construction. In the *Standards for School Premises Regulations* the Ministry of Education stated that in certain respects the Regulations had been made simpler and more flexible in order to give more scope for freedom and experiment in design and construction. This latitude has borne fruit in the Worthing Secondary Technical School where the Intergrid system of construction has been used as a prototype, and it is not only an example of a new system but also of the working of a development team comprising in this case the Architects and Building Branch of the Ministry, the Pre-Stressed Concrete Company, Ltd. and Messrs. Gilbert-Ash, the contractors. The County Architect's Department, West Sussex, have also collaborated on behalf of the Worthing Borough Council. This interesting system of construction was mentioned in this year's Conference paper 'Materials and Techniques' by Allen and Mills.

The development team drew up a list of requirements which the system would have to satisfy; it must be capable of 4-storey construction; conform to a 3 ft. 4 in. horizontal module; to a vertical module of 10 in. to allow ceiling heights and changes of level in 10 in. increments; provide an open-frame construction, for placing outer walls, windows and partitions at will; have a self-centering type of floor and roof construction; have a cladding system capable of erection from within the building to avoid the use of scaffolding; allow services to pass freely through the horizontal floor or roof construction, and be entirely of precast units designed for ease of handling and transport and speedy erection on the site. It must also reduce steel consumption to a minimum. A formidable programme, but it would seem that the team have effected compliance.

The columns are precast to a standard section 6½ in. by 4½ in. (6½ in. by 6½ in. along each axis for multi-storey construction) with grooved sides, in various lengths on a 10 in. vertical module. They are pretensioned and are of four main types, intended for erection in sockets cast in the foundation bases. The full range allows for ceiling heights of 8 ft. 4 in. up to 18 ft. 4 in. and for changes in level of 1 ft. 8 in. to 10 ft. in 10 in. increments. Four main types of mushroom column heads are used, designed to cater for every beam-fixing condition that may arise, and a further range of heads can accommodate changes of level in ceiling structure on opposite sides of any row of columns.

Three types of beams are used; boundary beams individual in design, and primary and secondary beams both made up of similar types of units. The boundary beams are cast in two standard lengths of reinforced concrete, 6 ft. 8 in. and 10 ft., and support either one or two beam connections. The primary beams are placed at 3 ft. 4 in. centres across the shorter span of each bay; they comprise two solid precast end units, 3 ft. 4 in. long, and the requisite number of intermediate units of identical pattern and 3 ft. 4 in. long by 12¾ in. deep. These primary beams are assembled and prestressed together on the site and are then lifted into position on the column heads. They are prestressed on the Freyssinet system, the wires being laid in grooves cast in the top of the lower flange of the beam unit and covered with grout after stressing.

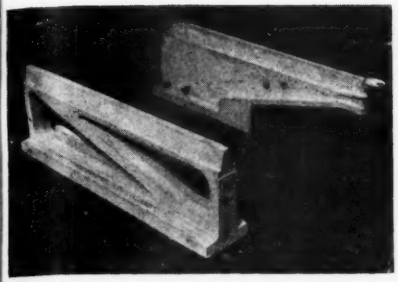
The secondary beams consist of units similar to those of the primary beams but having a projecting web for self-centering on the flange of the primaries. They are placed at 3 ft. 4 in. centres between the primary beams and on completion of each structural bay they are prestressed by wires passing in grooves formed on the outer edge of the lower flange. Holes in the primary beams allow the wires to pass through them By this method a two-way grillage system is effected, each beam receiving support from its neighbours in both directions; this gives a better distribution of loads, reduces deflection, and provides a greater margin of safety.



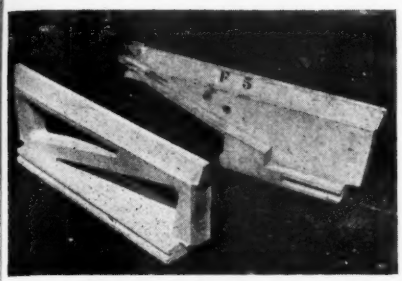
Lifting an Intergrid primary beam into position

The floor and roof slabs are solid unreinforced concrete nominally 3 ft. 4 in. square so that they can be placed within the squares formed by the top flanges of the beams. They are slightly domed on the underside. When grouted they act with the

Section of the Intergrid completed roof structure



Intergrid primary beam units



Intergrid secondary beam units

beam system to form a rigid, horizontal slab from which the necessary horizontal wind bracing can be obtained. Where top lighting is required 3 ft. 4 in. kerbs are substituted for the solid slabs and galvanised steel frames are used in conjunction with the kerbs.

The cladding is of cavity construction; the external skin being of precast concrete panels on which a variety of surface finishes can be provided. The panels are 6 ft. 8 in. and 10 ft. long and are fitted from the inside against projecting nibs cast on the external columns. Holes cast at 10 in. vertical centres in the columns and the ends of the panels allow fixing by means of tapered precast reinforced concrete pegs. The inner skin is of precast panels of Bellrock, the cavity being 1 in. wide.

The windows are in timber with hardwood opening lights and sills and have been designed to fit the structural system, being fixed to the columns in the same way as the cladding panels. For the ceilings asbestos board bearer strips are suspended from the beams by adjustable clips and are placed at 3 ft. 4 in. centres in both directions. The empty squares thus left can be filled with various materials giving sound absorption, fire resistance or other physical standards that may be required.

As an example of team work this Worthing school is of great interest.

Bonding Glass to Glass. In shopfront and showcase work the tendency today is to provide as uninterrupted a view as possible, but where the frontage is long it has been necessary to provide vertical supports between the sheets of glass, and these break up the view to some extent, however slender they may be. Corners are sometimes clipped together but this has a slightly make-shift look. A bonding cement that could take the place of vertical supports is the obvious alternative, but it must be lasting, dependable, and able to make a dustproof and weathertight joint.

After years of research such a cement has been perfected by German scientists in association with the firm of Glasbau Hahn and the material has now been introduced into this country by Messrs. James Clark and Eaton, Ltd., of Scoresby House, Glasshill Street, London, S.E.1. It is called the Clark-Eaton 'S.H.' Glass-Cement and is in two strengths, 'S.H.1' and 'S.H.2', the last being the stronger and recommended where the glass fitments are in constant use and likely to get rough treatment; 'S.H.1' being suitable for general purposes.

The cement is white and has the property of hardening only in the outer portions of the joint, the inner portion remaining permanently resilient. It is suitable for use with plate glass of ¼ in. thickness and upwards, and joints may be butted or mitred; thus sheets may be joined edge to edge to form an unbroken line or they may be connected at right angles. For positions where the sheets of glass may be subjected to some stress, as for instance where they adjoin glass doors, a narrow 'buttress' of plate glass is butted against the sheet and this provides all the stability required. Similarly glass shelves can be supported with glass 'beams'. By such means frameless showcases (vitrines) can be constructed entirely of glass. Glass tables, cemented with 'S.H.2', may be picked up without unhappy results.

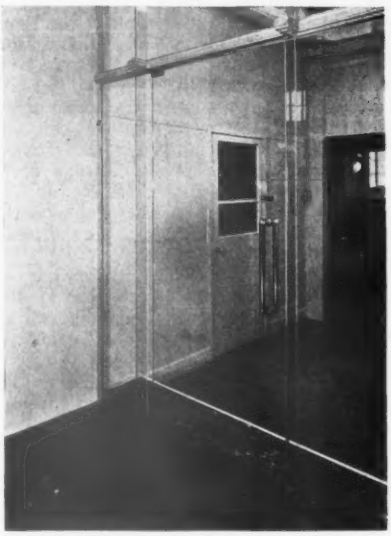
An indication of the strength of the cement joint was given at a demonstration watched by the JOURNAL, when a bracket of plate glass, cemented at right angles to a similar piece of glass held vertically, was loaded with weights. The bracket supported a weight of 60 lb. without fracture. When additional weights did cause failure it was mainly the glass and not the joint that broke.

Messrs. Clark and Eaton state that 'S.H.' Glass-Cement is unaffected by climatic conditions, and is widely used on the Continent for exterior work.

A Bricklaying Gauge. At the Ministry of Works Building Plant Exhibition, held at Reading in June, there was exhibited a bricklaying gauge which may interest architects although it is of more immediate concern to the contractor, as the inventor claims that by its use 10 to 15 per cent more bricks a day can be laid. The appliance is called the Clifton Patent Bricklaying Gauge; it consists of a small diameter tube 6 ft. 6 in. long with buttons attached at appropriate heights to suit the coursing. The wall must be built truly level and vertical for five courses and then the gauge is fixed to the internal or external corners by means of fixing straps let into raked-out joints. Adjustable screws allow for vertical alignment.

A line is then tied to one button and is fixed to the corresponding button on the gauge set up at the other end of the wall, or intermediately. Bricks can then be laid true to line. When the walling has reached scaffold height the gauges are removed and set up again at scaffold level, a locating rod being used for this purpose, resting on the last course of brickwork. As the bricks at the corners only touch the gauge tube tangentially there is little chance of mortar being squeezed downwards and dirtying the brick face, as might possibly happen if the gauge were angular. Inquiries should be addressed to Clifton Bricklaying Gauges, 387 Carterhatch Lane, Forty Hill, Enfield, Middlesex.

A frameless showcase of bonded glass



Bonded glass 'buttresses' at the jambs of a door

British Standards for Housing. The British Standards Institution have issued a pamphlet giving a selected list of British Standards for housing. This supersedes the list marked PD1758 dated December 1953 and has been brought up to date.

The new list is PD1923, dated July 1954, and may be obtained free from The British Standards Institution.

A.B.S. Christmas Cards

On sale from 4 October

AUGUST may seem unduly early to be thinking about Christmas Cards, but the Architects' Benevolent Society find that architects all over the world are anxious to buy them. Representations about the time it takes the JOURNAL to reach New Zealand or Central Africa, to send an order back, to receive the cards and to send them out before Christmas have caused publication of the designs to be advanced from September to August.

Card No. 1 is of the entrance doorway to Sinai monastery (whence came the Codex Sinaiticus) drawn by Colonel Frank Palmer Cook who has kindly lent the original. It is in full colour, mainly creamy stone and intensely blue Mediterranean sky. Size 6½ in. by 5 in. Price 9*d*.

Card No. 2 is a lithograph of the Pont St. Michel in Paris with Notre Dame in the background, from a drawing by Mr. A. Ivor Richards [*L*]. Size 5½ in. by 4¼ in. Price 6d.

Card No. 3 is for those who like a light-hearted card. It is in playing card colours, red and black, and illustrates the sizes of slates and drawing papers. It has been specially drawn for the A.B.S. by Mr. D. Juniper, a student at the Polytechnic, Regent Street, School of Architecture. Size 5½ in. by 4¼ in. Price 9*d*.

Card No. 4 is from an ink drawing by Mr. J. A. Skovgaard [*A*], who has kindly lent the block, thereby saving the A.B.S. the cost of making one. Size 5¾ in. by 4¼ in. Price 6*d*.

Card No. 5 is of an abstract design, in black and white, specially drawn for the A.B.S. by Miss Norah Glover [*A*]. Size 5½ in. by 4¼ in. Price 6*d*.

Our illustrations do not of course reproduce the full effect of the cards and they show the drawings only and not the whole extent of the cards.

Cards may be ordered by post or purchased at the offices of the Society, though they will not be available until 4 October. Orders may, however, be booked.

In addition, if required, the Society will have cards printed with the name and address of the purchaser, provided orders for these are received not later than 1 December. Overseas purchasers who give special orders of this kind should advance their ordering date by the time which parcel post from Great Britain normally takes to reach them. The A.B.S. cannot send packets of cards by air mail unless purchasers are prepared to pay the cost of this. The cards will have on the third page the words 'Greetings and Good Wishes', beneath which there will be space for a written or printed name and address. The cost of printing a name and address is £1 10*s*. for the first hundred and £1 for each additional hundred or part of a hundred. Printing of names and addresses cannot be undertaken for less than fifty cards of the same kind. The printing of names and addresses will be in the same colour and type as the words 'Greetings and Good Wishes'.

Card No. 1. In full colour. Price 9*d*. The entrance to the Monastery of Sinai

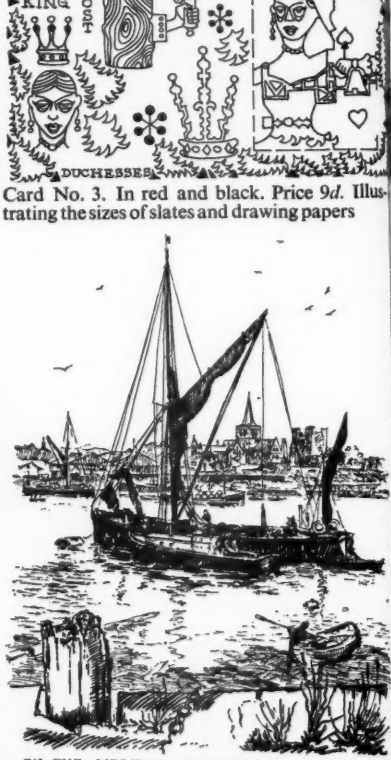
Card No. 2. Lithograph. Price 6*d*. The Pont St. Michel and Notre Dame, Paris

To avoid too great a last minute rush in the A.B.S. office and at the printers, intending purchasers are asked to send in their orders *as early as possible*. Points to remember: state the index numbers of the designs you select and the totals required; send cash with order; names and addresses that are to be specially printed to be typewritten or in block letters; orders for special printing not later than 1 December, but preferably earlier; you can buy any number of cards from one upwards, but if your name and address are to be printed the order must be not less than fifty.

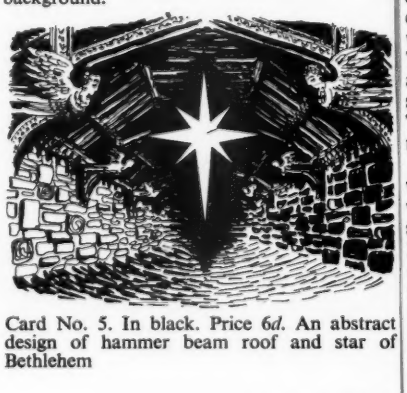
Certain of the cards sold in previous years are available in limited numbers. These can be seen at the offices of the A.B.S.

During the last three years the funds of the A.B.S. have benefited considerably from the sale of these special Christmas cards. All architects are asked to purchase some if not all their cards from the A.B.S. and thus to help their own charity.

Card No. 3. In red and black. Price 9*d*. Illustrating the sizes of slates and drawing papers



Card No. 4. In black. Price 6*d*. The Medway with sailing barge and Rochester in the background.



Card No. 5. In black. Price 6*d*. An abstract design of hammer beam roof and star of Bethlehem

Festival Flats at York

Architects: Gordon Toplis and Robert Meadows [*AA*]

IN CONNECTION with the 1951 Festival of Britain it was decided to hold an open competition for flats to be built in York to commemorate the event, and the winning design was that of Messrs. Toplis and Meadows. The site selected was in the southern area of the city immediately south of the city walls, part of the area being derelict and the remainder scheduled for redevelopment in the next 50 years. The conditions of the competition called for three-storey blocks of flats arranged to provide a good lay-out for both the interim and final development. At the important junction of Fishergate and Paragon Street there was an untidy medley of buildings likely to remain for some time, and the first stage in the development was intended to screen this area; it was also essential to bear in mind the mediaeval walls and the good 18th-century vernacular buildings of the neighbourhood.

It was therefore decided that the immediate building programme should comprise two blocks at right angles, parallel respectively to Fishergate and Paragon Street, and linked by a screen wall with access steps and a door leading to the space at the rear. The north block was curved to allow for the improvement line in Paragon Street and to fit in with future development. Access for vehicles from the two main roads was avoided and was provided from a minor road to the east. The irregular area behind the blocks gave opportunity for providing a turning space as well as a reasonably-sized drying yard and a play area for children. To the east there was a public house standing well forward of the new building line and an additional screen wall was built here as a link; the semi-derelict gable wall of the public house exposed by the clearance was repaired as necessary to complete the group.

General Construction. Trial borings disclosed that the subsoil was very bad, as it consisted largely of made-up ground and wet sandy clay with poor bearing capacity. The type of foundation finally chosen was a reinforced concrete raft for each block, stepped to follow the slope of the ground. The site sloped in both directions towards the north-west corner.

Below ground floor level the external walls were built in 15½-in. cavity brickwork; above that level they have been constructed with a 4½-in. brick outer leaf, a 2¾-in. cavity and a 4½-in. foamed slag concrete block inner leaf, the wall ties being set at 9-in. centres vertically and 3 ft. horizontally. The facing bricks are local yellow-grey hand-moulded sandstocks with a purple-red colour for the plinth. The central spine wall is in 9-in. brick reducing to 4½ in. on the top floor. The partitions generally are in 2½-in. breeze block. The floors are in precast concrete.

A perspective sketch of the Festival flats

The roof is a simple timber structure of normal design, set at a 30-degree pitch, felted and battened and finished with red clay pantiles.

The windows are purpose made, in metal, set in fine concrete sub-frames.

Accommodation. The schedule of accommodation is as follows:—

3 single-person flats, comprising living-room, bed recess, working-kitchen, bathroom and w.c. 416 ft. super.
1 single-person flat; living-room, single bedroom, working-kitchen, bathroom with w.c. 444 ft. super.
1 two-person flat; living-room, double bedroom, working-kitchen, bathroom, w.c. 514 ft. super.
3 three-old-person flats; living-room, 1 double and 1 single bedroom, dining-kitchen, bathroom, w.c. 623 ft. super.
1 flat for caretaker (3 persons); living-room, 1 double and 1 single bedroom, working-kitchen, bathroom, w.c. 641 ft. super.
6 five-person flats; living-room with dining-recess, 2 double bedrooms and 1 single, working-kitchen, bathroom, w.c. 857 ft. super.
2 six-person flats; living-room and dining-space, 2 double and 2 single bedrooms, working-kitchen, bathroom, w.c. 1,014 ft. super.
2 eight-person flats; living-room and dining-recess, 4 double bedrooms, working-kitchen, bathroom, w.c. 1,120 ft. super.
1 eight-person maisonette; living-room and dining-recess, 3 double and 2 single bedrooms, working-kitchen, bathroom with w.c., separate w.c. 1,273 ft. super.

The seven flats on the ground floor are designed to comply with the Ministry of Health standards for old persons' dwellings. In the north block the living-rooms face south and the dining-recesses—where provided—are on the north side with windows overlooking Paragon Street and the city walls. In the west block living-rooms and dining-recesses face west over Fishergate. All first and second floor flats have balconies facing south or west. The main staircases serve two flats at each floor level.

An entrance with staircase windows over

A utility room is provided to every two flats and contains the fuel stores and refuse bins; on the first and second floors these rooms are served by hand-operated goods lifts. The fuel stores for the old persons' flats on the ground floor are arranged so that they are accessible from within the flats. Lock-up stores for prams and bicycles have been provided for all flats and can be reached without going into the open air. There is also a laundry and adjacent to it is a workshop.

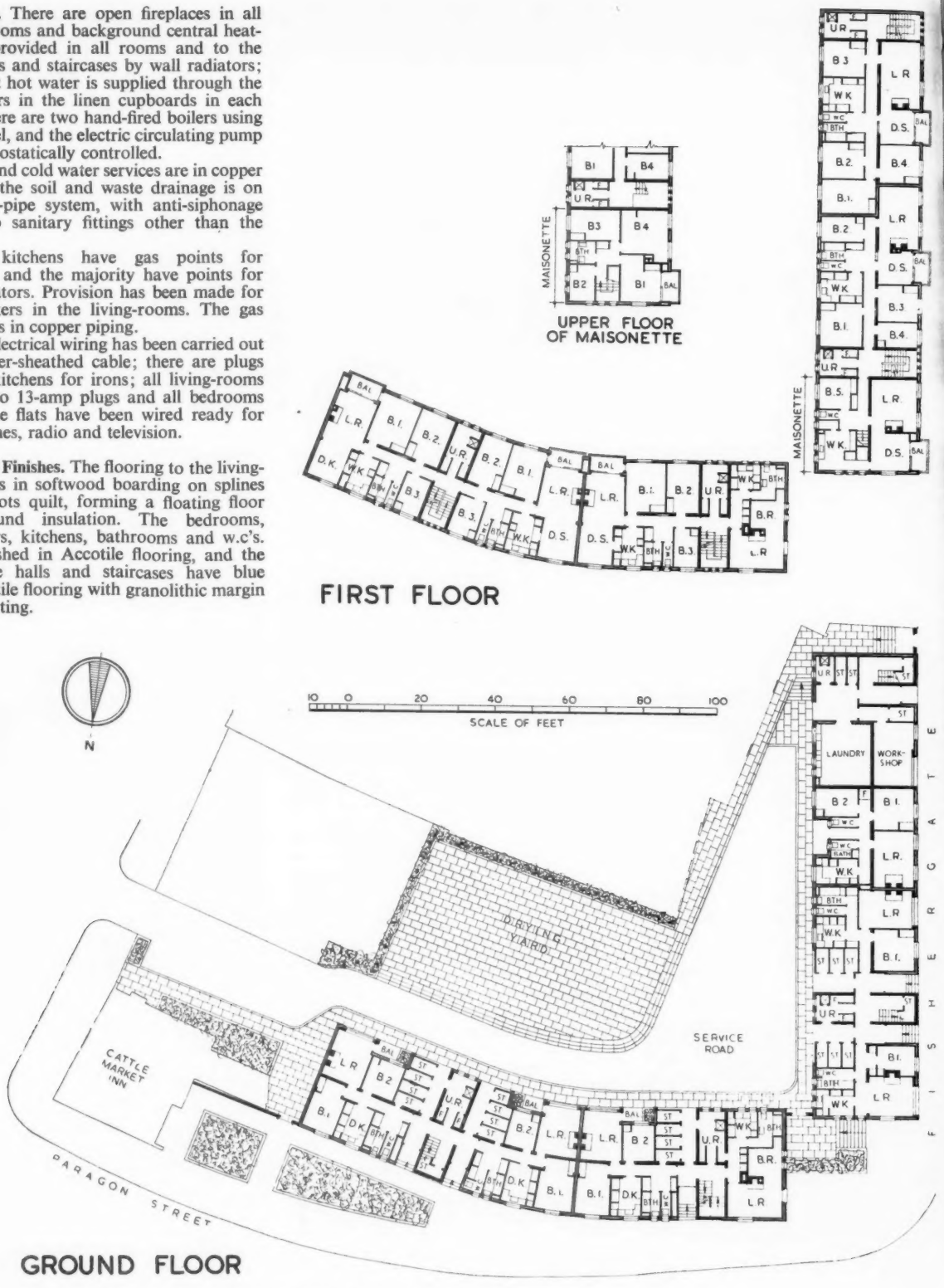
Services. There are open fireplaces in all living-rooms and background central heating is provided in all rooms and to the corridors and staircases by wall radiators; constant hot water is supplied through the calorifiers in the linen cupboards in each flat. There are two hand-fired boilers using solid fuel, and the electric circulating pump is thermostatically controlled.

Hot and cold water services are in copper piping; the soil and waste drainage is on the one-pipe system, with anti-siphonage traps to sanitary fittings other than the w.c's.

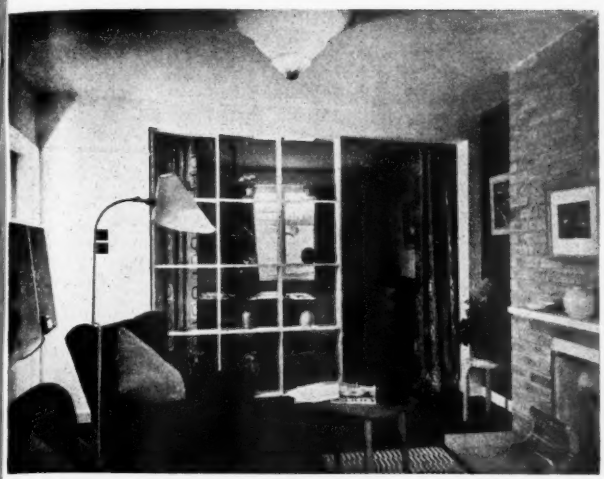
The kitchens have gas points for cookers and the majority have points for refrigerators. Provision has been made for gas pokers in the living-rooms. The gas service is in copper piping.

The electrical wiring has been carried out in copper-sheathed cable; there are plugs in the kitchens for irons; all living-rooms have two 13-amp plugs and all bedrooms one. The flats have been wired ready for telephones, radio and television.

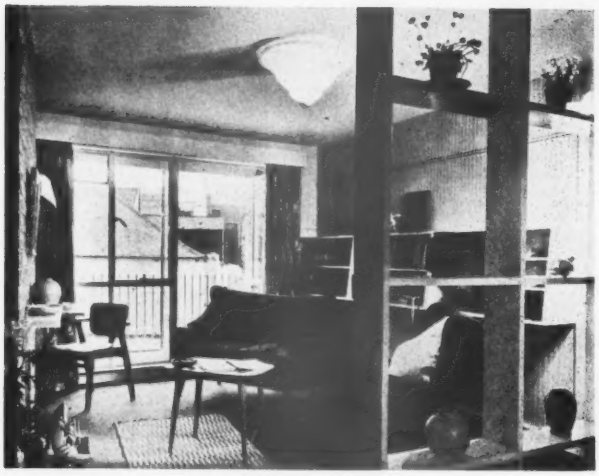
Internal Finishes. The flooring to the living-rooms is in softwood boarding on splines on Cabots quilt, forming a floating floor for sound insulation. The bedrooms, corridors, kitchens, bathrooms and w.c's. are finished in Accotile flooring, and the entrance halls and staircases have blue quarry tile flooring with granolithic margin and skirting.



Ground and first floor plans of the Festival flats, showing service road and drying yard

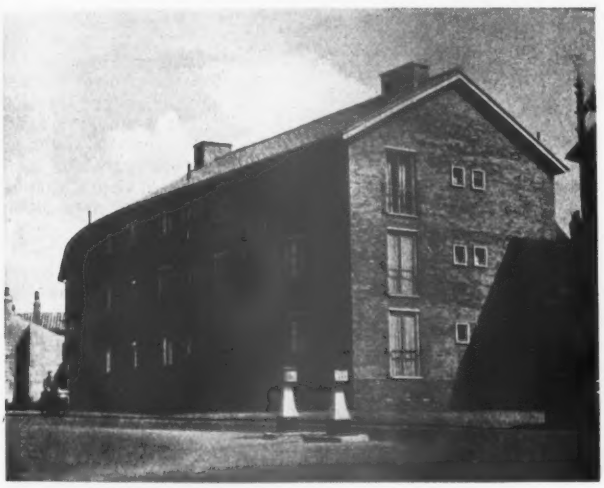


A dining-space, from the living-room



A living-room, from the dining-space

The flats facing Fishergate

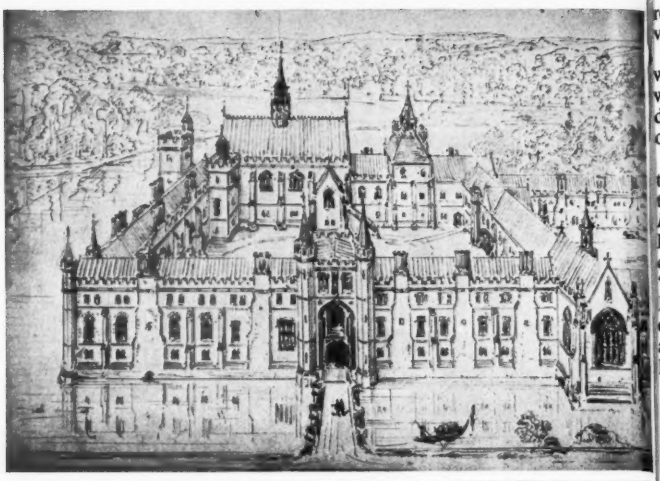


The flats facing Paragon Street

Flank wall of Paragon Street block, next Fishergate

The Paragon Street block, from the service road

Perspective of the church



Right: perspective and elevation of the palatial residence

An Important Pugin Item for the R.I.B.A. Library

By Cyril G. E. Bunt

A SMALL QUARTO, morocco-bound volume, recently acquired at auction by the Library of the Institute, is a desirable and interesting addition to the drawings collection. Fifteen pages of its vellum-like sheets, which bear watermarks for 1839 and 1841, are occupied by characteristically meticulous pen drawings from the hand of Augustus Welby (Northmore) Pugin, each signed with the familiar monogram and dated 1841–1842.

The volume is important not only because of this, but because it is associated with the most interesting period of the artist's evolution, has bearing upon one of his greatest friendships and upon the history of the early stages of the Gothic Revival. It contains the bookplate of Ambrose March Phillipps (de Lisle), Pugin's intimate friend and, one might say, collaborator with him in the revival of mediaevalism in English architecture.

It is clear that the drawings, perhaps already in book form, were intended to be and indeed were a present from Pugin to March Phillipps, two of the pages bearing a gothicised monogram of the latter as an integral part of the scheme. This adds interest to the drawings, for, taking into account the dates of the watermarks and the dates of the drawings, it relates the contents without doubt to projects which were in the minds of both at the period. We are taken a step further by the device of the first page, which shows the west elevation of a noble Gothic church, flanked by the kneeling figures of a man and a woman, beneath which is the legend 'Pray for the Founders', while above is the figure of the Blessed Virgin with the Divine Child in her arms, standing upon the crescent moon and surmounted by a crown upheld by two angels.

The significance of this little composition cannot be misunderstood, for the Virgin and Child displayed as above was the sign or symbol of the patronage of St. Bernard's Cistercian monastery in Charnwood Forest, founded by the efforts of Ambrose Lisle March Phillipps and for which he gave 230 acres of land in the forest in 1835. He was therefore one of the founders, the other being the Earl of Shrewsbury, who gave £3,000 towards the erection of the permanent monastery, of which Pugin was the architect. March Phillipps, who had two residences in the neighbourhood, at Garendon and Grâce Dieu, was perhaps Pugin's greatest friend at the period, and the architect and his work are referred to in a letter from Phillipps to his father at the time. 'Lord Shrewsbury is going to build a new monastery for the monks at Mount St. Bernard under Pugin's direction. He has given three thousand pounds for this object and will give more later.'

The buildings, when they eventually became a *fait accompli*, were 'the first of their kind in post-Reformation England', as Trappes-Lomax has put it; a point mentioned here to show that the drawings in this little book reveal Pugin at the most formative period of his activities. For they do not in any way conform to the 'severity of the lancet style, with massive walls and buttresses, long and narrow windows', etc., which that monastery is known to possess. On the contrary, they show a truly noble church—interior of nave, choir, chantry chapel, plan and perspectives—as well as a mediaeval-looking preaching cross. There follow six fine little sketches, or rather finished drawings, of the plans, views in perspective and interiors of a palatial residence, the like of which could only have emanated from the fertile brain and imagination of Augustus Welby Pugin. We

reproduce a picture of the church and two views of the residence.

Since they are, then, unlike anything which Pugin built at this time, what are we to think of this project which so evidently was put forward for the edification of his friend March Phillipps?

The answer—and it is that which makes the importance of this volume evident—is to be found in the pages of the *Life and Letters of Ambrose Phillipps de Lisle*, by Edmund Sheridan (1900), where we read of these designs, never carried out, for a 'gorgeous church' for Mr. Ambrose March Phillipps. They are referred to as 'a series of exquisite drawings, preserved in the Library at Garendon, which, if carried out, would have made old Garendon, then a ramshakled rats' castle, into a miniature Palace of Westminster, with twenty-seven old fish-ponds artistically connected one with another, to form a complete moat of defence, which was to have been approached by a drawbridge and gateway'.

It is nothing like Garendon as it is, but we need not be surprised at that. A writer in THE ECCLESIOLOGIST for January 1846, reviewing three books by Pugin, refers to a well-known characteristic of the architect in thus producing elaborate designs representing buildings, whether begun or not, 'as in a state of perfection'. He calls it 'pictorial architecture' and is not too pleased that Pugin should thus have misrepresented the 'Present State of Ecclesiastical Architecture in England.' But surely to us of a later period such gigantic conceptions, even if not carried out, are of great interest, for they show us what Pugin would have wished to achieve had he had unlimited resources at his disposal.

Between the leaves of this book are also preserved a drawing by Pugin of a reliquary of St. Thomas, signed and dated 1847, and two drawings by Ambrose Lisle Phillipps himself. The latter are close pen sketches—a perspective and interior—of the choir of St. Edmund's Collegiate Church, Ware. Finally, though not for certain either by Pugin or Phillipps, there are plans of the old house at Garendon, which presumably Pugin would have wished to replace with the magnificent structure of which this volume is apparently the only record.

Correspondence

'MATERIALS AND TECHNIQUES'

DEAR SIR,—The paper on 'Materials and Techniques', by Mr. W. A. Allen and Mr. E. D. Mills, has been of much interest to our profession; however, several subjects discussed might require further clarification.

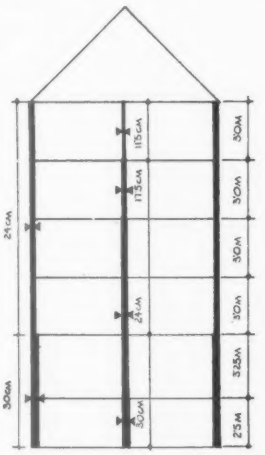
The 14-storey point block raised 13 storeys within a fortnight (JUNE JOURNAL, p. 315) is no typical example of German building technique. It was built to mask the completed reconstruction of a Hamburg neighbourhood which is owned by an enterprising and publicity-conscious housing association. One hundred and eighteen operatives worked day and night to raise the climbing shuttering. The insertion of floors after the completion of the walls is costly enough to counteract any initial advantages. The authors further refer to a 19-storey block built in no-fines concrete. This type of building is generally faced with rendering, which is a lasting and attractive finish in many continental countries. Adhesion is assured because the rendering is either flicked on by hand or sprayed mechanically; in addition, atmospheric conditions are not too severe. Our climate, however, requires a type of unit cladding, possibly as permanent shuttering, which not only prevents a moisture penetration, but also maintains a good appearance in urban areas. Has it been established yet how costly this would be?

The authors mention Germany and Sweden 'where 9-in. light-weight blocks carry nine-storey structures'. This appears to be an astonishing achievement. Are they referring to perforated clay or concrete blocks, or light-weight concrete blocks (aerated, pumice, etc.)? It would be interesting to know what spans were used and how the loadbearing walls were stiffened. I enclose the section of a block of flats with load-bearing walls of perforated clay units. The design conforms to the latest German standard specifications and the structural requirements of the Land Rhineland-Westphalia. The external walls of basement and ground floor are 12 in. (30 cm.) thick. This agrees with what I generally saw during two recent visits to Germany. I also understand that in Sweden the lower portion of five-storey structures with load-bearing walls of light-weight concrete blocks consists of 14-in. thick walls, whilst the upper portion consists of 10-in. walls.

In conclusion, I should like to refer to two continental techniques which substantially increase productivity while requiring little extra expenditure and special equipment: first, the laying of normal bricks by specialised teams. The practice is not unknown in the United States and the Netherlands, but has only been widely used in the Soviet Union; equally so in Eastern Germany. A team of three—bricklayer, mate and carrier—may achieve a daily output of between 3,000 and 4,000 bricks. The carrier carefully stacks the bricks in order of bonding next to the wall to be erected, the mate spreads a long stretch of bedding mortar and the bricklayer squeezes bricks into position. The completed walls tend to be rough and the technique may therefore be more suitable for internal walls, e.g. load-bearing cross-walls. This kind of bricklaying was tried out successfully half a century ago by the pioneers of time and motion studies, Gilbreth and Taylor.

Secondly, much saving of time and money can be achieved by careful phasing of site operations, a technique successfully used both in Holland, Germany and Russia. In one German town 144 flats grouped in three-storey blocks could be built in less than six months. This necessitated joint advance planning by architects, contractors and operatives. A team of operatives specialised in one particular operation or phase, e.g. excavations, concreting of floors or the laying of wall units. A very light, self-climbing lifting device was used. Generally, the current tendency in Germany is to develop more standardised and lighter equipment. If the latest light tower cranes and lifting devices have a limited performance, this is more than offset by greater mobility and reduced cost of erection and dismantling. The crane used last year to erect two-storey cottages in Norwich would be regarded as far too heavy.

It seems therefore that the most spectacular techniques seen abroad may not



necessarily be the most practicable when adapted to the requirements of this country.

Yours faithfully,

R. ROSNER [*A*]

BILLS OF QUANTITIES

DEAR SIR,—I am at a loss to understand why the English bills of quantities are not prepared after the manner of the Scottish bills, in being combined with a specification of work in one document.

Surely this would make it possible to pin down in detail each item tabulated, save work for the quantity surveyor where he has to prepare both specification and the bills and be more helpful to architect and builder.

Yours faithfully,

R. P. SMITH [*Student*]

ARCHITECTURAL JOURNALISM

SIR,—As an architectural journalist I have been particularly interested to read the proceedings of the R.I.B.A. meeting on architectural journalism, which I was unfortunately unable to attend, and the written contribution to the discussion printed in your July issue.

I cannot agree with Mr. H. L. Childe that there is any risk involved for the editor who makes informed and constructive criticism of current architectural work.

Moreover, I believe that it is the *duty* of editors of architectural papers to publish such criticism.

The man who does not think he will like a particular book does not have to read it; the man who does not think he will like a particular painting does not have to visit the art gallery where it is being displayed; but a building is there for all to see.

It is my experience that many architects welcome criticism in the responsible architectural (and non-architectural) Press, as is indicated by the fact that, although they cannot send complimentary replicas of their building, they do often supply photographs and drawings of their recently-completed buildings to the editors of their favourite architectural papers, even if they are risking published criticism in doing so.

Mr. H. L. Childe vastly over-simplifies when he says that 'to say an architect's work is not good architecture is to say that he is not a good architect'. The work of an architect has many facets—only to some of these would Mr. Childe's remark apply. For example, if an editor were to say 'Mr. X's building is structurally unsound—it is liable to fall down if we get a strong gale'—this would certainly imply that Mr. X was 'not a good architect'. But if an editor says 'we feel that it was wrong to give emphasis to the first-floor balconies because this implies that the rooms on the first floor have a different function from that of the rooms on the floors above'—this implies only that the editor believes that his aesthetic judgment is better than that of Mr. X, and it is for the reader to judge whether that is so.

With regard to the vexed question of advertisements—the economics of the illustrated architectural periodicals are somewhat different from those of the more highly technical publications which Mr. Childe edits. Without advertisements an illustrated architectural weekly now selling at 1*s.* might cost between 2*s.* and 2*s.* 6*d.*, while a 2*s.* 6*d.* monthly might cost 4*s.* 6*d.* or 5*s.* Unless architects are willing to pay these amounts they must put up with having the editorial pages sandwiched between two wads of advertisements.

However, this does not mean that the worst possible interpretation must be put on the statement that 'it is the Editor's job . . . to devise a formula which will . . . induce advertisers to lend support'. It is true that some papers take the easy way out and print, in precisely the form in which they receive them from the publicity agents, eulogies of the products of their advertisers. (This is not surprising when it is realised that, with full-time editorial staffs only two or three strong, it is as much as some papers can do to cope with the mechanics of filling with text and photographs a given number of pages in each issue.)

However, there is another, better way of inducing advertisers to lend support—that is to produce a good, lively, accurate and critical paper which will gain such a large circulation that potential advertisers cannot afford *not* to advertise in it, whatever the editor may say about their products.

Yours faithfully,

MAURICE JAY [*Student*]

Saving Historic Buildings

The Historic Buildings and Ancient Monuments Act. Historic Buildings Councils for England, Scotland and Wales were appointed by the Minister of Works in 1953, in accordance with the Historic Buildings and Ancient Monuments Act 1953. This Act empowers the Minister, after consulting the appropriate Historic Buildings Council, to make grants towards the repair or maintenance of buildings of outstanding historic or architectural interest, their contents or adjoining land; to acquire such buildings, contents and land; or to assist local authorities or the National Trust to acquire historic buildings. On 13 May 1954 the Councils published their first annual reports covering the period up to 31 December 1953.

The sum of £250,000 has been voted for maintenance and repair grants for the present financial year. £500,000 for the National Land Fund is available over the next five years for acquisitions under the Act.

Application for Grants. Anyone responsible for the maintenance of a historic building which is thought to be of outstanding historic or architectural interest can apply to the appropriate Historic Buildings Council for a grant towards the repair or maintenance of the building. Applications should be addressed to the secretary of the appropriate Council (Historic Buildings Council for England, Lambeth Bridge House, S.E.1; Historic Buildings Council for Scotland, 122 George Street, Edinburgh, 2; Historic Buildings Council for Wales, at either St. Agnes Road, Gabalfa, Cardiff, or Lambeth Bridge House, S.E.1). Applicants should give details of the repairs needed, the estimated cost, and the amount of the grant requested. Other information which is helpful to the Councils, if it can be provided, is a copy of an architect's report on the building where the applicant has already obtained one, and some statement of the applicant's own recent expenditure on the repair and maintenance of the building.

Problem of Unoccupied Historic Buildings. A small but important proportion of applications received by the Historic Buildings Councils concerns historic buildings which are empty and falling into decay. In some cases the owner, having failed to find a new use, may have given the local planning authority notice of his intention to demolish, under section 30 of the Town and Country Planning Act 1947, and a report of the threat to the building will then, in important cases, reach the Historic Buildings Council through the Ministry of Housing and Local Government. In addition, reports of buildings in danger may be received by the Historic Buildings Councils from owners or from other interested persons or societies.

Generally the funds available for preserving historic buildings are too limited to permit buildings to be preserved as empty shells, and moreover it is not Government policy to do this. Hence, before recommending the Minister to offer aid in these cases, the Councils must find a use for the building. The English Council is particularly concerned with this problem of empty historic buildings and has adopted the following procedure.

When the Council has received a report on an unoccupied building for which it has proved impossible so far to find a use, it first considers whether the building is of outstanding interest, and if so it refers the problem to its Committee on Uses for Historic Buildings under the chairmanship of Mr. W. M. F. Vane, M.P., a member of the Historic Buildings Council for England.

The Historic Buildings Bureau and How it Works. This Committee on Uses is assisted in its work by the Historic Buildings Bureau, which is staffed by members of the Ministry of Works Directorate of Lands and Accommodation. The Director of the Bureau (Mr. R. C. Rose, F.R.I.C.S.)

Premises for which the Historic Buildings Council Wishes to Find a New Use

Property	*Brief Description*
Howsham Hall, Malton, Yorks. (12 miles north-east of York)	A Jacobean mansion with 18th century interior. Grounds: About 12 acres. 18 rooms. Approx. area 11,000 sq. ft.
Cusworth Hall, Doncaster, Yorks. (2 miles west of Doncaster)	18th century, wings by James Paine. Grounds: By negotiation. Approx. area 12,000 sq. ft.
Staunton Harold, Leicestershire (5 miles north-east of Ashby-de-la-Zouch)	Mainly 18th century. Grounds: By negotiation. 66 rooms. Approx. area 30,000 sq. ft.
Kenyon Peel Hall, Little Hulton, Lancs. (4 miles south of Bolton)	Early 17th century, half-timbered. Grounds: About 3 acres. 21 rooms. Approx. area 5,000 sq. ft. Agents: W. H. Cooke & Arkwright, 24 High Street, Mold.

maintains a list of those buildings considered to be of outstanding interest and for which a new use is required. Anyone interested in using a historic building is invited to get in touch with the Bureau at Romney House, Marsham Street, S.W.1 (ABBey 7755, ext. 518).

It must be made clear that it is not the intention to intrude into a field which is the proper concern of the owner and his professional advisers, but rather to provide a supplementary service to help both owners and surveyors in special cases.

Buildings with which the Historic Buildings Bureau is Concerned. The buildings with which the Bureau is concerned are only those for which the Historic Buildings Council will consider recommending some financial aid if a satisfactory scheme for using the building can be worked out and if such a scheme cannot be carried out without Government aid. The scale of such aid will of course vary according to the circumstances.

Such buildings may be suitable for private occupation, either as a whole or divided. Others might be suitable for occupation as schools, hospitals and nursing homes, old people's homes, club houses for the staff of business concerns or industrial establishments, local community centres, religious institutions, holiday hostels and hotels, and for many other purposes.

A list of buildings for which a new use is being sought by the Bureau is attached, and particulars of further buildings which are referred to the Bureau will be published subsequently.

Practice Notes

Edited by Charles Woodward [*A*]

IN PARLIAMENT. Model Building Bye-laws. Asked to what extent the new model building bye-laws have been adopted by local authorities, when the model building bye-laws were last revised and what were the principal changes made, the Minister of Housing and Local Government replied:—'Of 1,336 local authorities whose building bye-laws expired this year, 1,328 have adopted new bye-laws based on the model. The new bye-laws are either already in force or will shortly be in force.

'An authoritative and fully representative committee was appointed in June 1951 to advise on the preparation of new model building bye-laws, in view of the great advances which had taken place in building methods and technical knowledge since 1939 and which had made the existing byelaws out-of-date. As a result, a new series was published in November 1952; and a further edition appeared in July 1953.

'The main object of the new series has been to allow the utmost possible freedom in building methods and the use of new materials. This has been achieved by expressing the constructional parts of the bye-laws in terms of the functional requirements of the building without requiring any particular material to be used. Materials and methods of using them which conform to British standards or codes of practice are sufficient compliance with the requirements of the bye-laws.' (6 July 1954.)

House Purchase Loans—Circular 42/54. Asked how many local authorities have agreed to exercise the powers contained in the appendices to Circular No. 42/54 and to guarantee loans for the acquisition of houses and flats and how many have refused, the Minister of Housing and Local Government replied:—'332 local authorities in England and Wales have agreed to help would-be house purchasers who cannot find the deposit ordinarily required by a building society by adopting the two guarantee schemes explained in the appendices to Circular 42/54. Thirty-seven authorities have said that they do not propose to operate the schemes, but I have asked them to reconsider the matter and hope that they will change their minds. As the circular was sent to local authorities only just over two months ago, I think the figures I have given are satisfactory. In the autumn I hope to hear from more authorities that they have decided to use the two guarantee schemes to help men in the £11 to £14 a week group who want to own their own houses.' (26 July 1954).

MINISTRY OF HOUSING AND LOCAL GOVERNMENT. Development Plans Amendment Regulations. Circular 48/54 dated 15 July, addressed to local authorities in England and Wales, refers to the Regulations made by the Minister so as to remove minor procedural difficulties and to simplify the submission of proposals for alterations or additions to operative development plans.

The Regulations provide for a new kind of map called a supplementary town map which will be similar in scale and mode of presentation to comprehensive development area maps. This new map will enable the local planning authority's proposals for certain areas to be shown in more detail.

The Regulations (S.1.1954. No. 933) and the Circular can be obtained at H.M. Stationery Office, price 4*d*. each net.

Requisitioned Premises. Removal Expenses. Circular L.R.L. 4/54 dated 22 July, addressed to housing authorities in the London region, states that where a removal is made compulsorily in order to fit the amount of accommodation to the size of the occupying family or to secure that the family is accommodated in property more suited to its economic position, the Minister is prepared to approve a payment not exceeding £10 towards the cost of removal, without any qualification as regards financial hardship to a licensee, provided that as the result of the exchange a property is released from requisition.

There may be other circumstances in which a removal is desirable and payment in such cases will be considered by the Minister on their merits. Circular L.R.L. 3/54 dated 18 January is withdrawn.

Local Government Superannuation Acts. The Minister has made Rules in connection with the surrender of superannuation allowance, and Circular 47/54 dated 5 July, addressed to local authorities in England and Wales, describes the changes now made.

The Local Government Superannuation (Surrender of Superannuation Allowance) Rules 1954, S.1. 1954, No. 879, can be obtained at H.M. Stationery Office, price 4*d*. net, together with Circular 47/54 and the Allocation Tables, price 3*d*. and 6*d*. net, respectively.

LONDON COUNTY COUNCIL. District Surveyors' Fees. The L.C.C. are proposing to promote a Bill to amend the London Building Act 1939 in respect of district surveyors' fees. It was expected that the fees laid down in the 1939 Act would reimburse the L.C.C. for the cost of these services, but this has not been realised. Building costs have increased to more than three times the 1939 level but building restrictions have limited the fees paid and the cost of staff salaries has risen by 50 per cent. It is proposed to increase the fees so as to provide additional revenue of about 40 per cent, so that the total annual fees will equal approximately the cost of the district surveyors' duties under the London Building Acts. It is proposed that the fee scales shall be simplified, that where checking of structural calculations is necessary, one-third of the fee shall be paid in advance and retained even if the building work is not carried out. It is also proposed that the L.C.C. shall have power to amend fees by bye-laws.

The proposed Bill will include amendments to the 1939 Act in respect of the recovery of the Council's expenses in dealing with dangerous structures, and give power for the Council to enter on adjacent or adjoining land in order to deal with dangerous structures.

DUSTBINS AGAIN. Acton magistrates have over-ruled a Borough Council order that two landlords should provide dustbins for their tenants, and they declined to make an order against the tenants. The Clerk of the Court suggested that the local authority could provide the dustbins and charge them on the rates, to which the Deputy Town Clerk replied that it would be very expensive.

R.I.B.A. FORM OF CONTRACT. CONDITION 22. Arbitration Award in respect of Cash Discounts. I. W. Gard (Builders) Ltd. and Chelmsford Corporation. This Award was stated in the form of a Special Case for the opinion of the Court, but as neither party took steps to bring the matter before the Court, the Award of the Arbitrator became effective.

The facts found in the case were that the Corporation from about 1946 had pursued

a policy of bulk buying of goods for their various housing schemes, so that they should be used by contractors employed to carry out the building.

The contractor in executing an earlier contract had obtained supplies of various articles from the Corporation which had been included in the Bills of Quantities of that contract as prime cost items. He had been allowed and paid by the Corporation a cash discount of 5 per cent on such articles as he would have been had they been obtained from a nominated supplier who had agreed to such cash discount in accordance with Condition 22 of the Conditions of Contract. The Corporation had made no special agreement that this cash discount would be allowed. In their statement of final account for this contract the Corporation described this item as 'cash discount allowed to contractor'.

When the contractor tendered for and entered into the four contracts concerned in this case he was not informed by the Corporation that he would not be allowed 5 per cent cash discount on goods obtained by him from the Corporation's depot and specified in the Bills of Quantities as prime cost items to be supplied by them, as he had been allowed in the earlier contract.

To all of the prime cost items in question in the Bills of Quantities and Specification there was an addition for profit and an addition for carting, unloading and storage on site. In pricing these items the contractor did not add anything for profit but added a sum for carting and storing.

The Corporation's architect did not nominate any suppliers for prime cost or provisional sum items under any of the four contracts nor did he at any time inform the contractor that he, the contractor, was at liberty to order such goods from other suppliers. Knowing that the goods were available at the Corporation's depot the contractor obtained orders from the Clerk of Works and then collected the goods from the depot.

The Corporation did not debit the contract with the cost of the prime cost items obtained from them, nor, except for the calculation of profit, were such costs taken into account by the Corporation in calculating the amount due to the contractor.

It was contended on behalf of the contractor that if there was any conflict between the Conditions of Contract and the Bills of Quantities, the Conditions of Contract must prevail: that by Condition 22 and 24(*e*) the contractor was entitled to a discount of 5 per cent in respect of goods obtained from the Corporation's depot, on the ground that the Corporation in the circumstances must be regarded as nominated suppliers who had agreed to allow a discount of 5 per cent.

It was contended on behalf of the Corporation that if there was any conflict between the Conditions of Contract and the Bills of Quantities, the latter must prevail: that the contractor was not obliged to order the goods from the Corporation, but having done so without any express agreement to be allowed 5 per cent cash discount, he was not entitled to such discount even if the Corporation were nominated suppliers within the meaning of Condition 22.

The Arbitrator's determination was as follows:—

'The Corporation were never in breach of the contracts. The contract does not oblige the Corporation to nominate any suppliers and except by the terms of the Bills of Quantities the Corporation never required the contractor to order their goods.

'The Corporation were, within the meaning and intent of the Contract, nominated suppliers of the goods in question. The Corporation by failing to give notice to the contractor that he would not be allowed the cash discount which had been paid to him under the earlier contract, and in accepting his orders for their goods under the contracts here in question, by their conduct (whether they be regarded as a nominated supplier or as the employer) undertook or were estopped from refusing to pay the same.

'The contractor had warning by a letter of 18 July 1950 from the Corporation's agents that he might not be entitled to any cash discount and in placing orders for their goods thereafter without obtaining the Corporation's express agreement for the discount he did so with his eyes open and therefore at his own risk.'

The Award was as follows:—

'I Award that the Claimants are entitled to and shall be paid by the Respondents such a sum as represents 5 per cent on the cost of all goods specified in the Bills of Quantities of the four contracts here in question as prime cost items to be obtained from the Corporation and which were so obtained by the Contractor on orders given by him prior to the 18 July 1950. I also Award to the Claimants the costs of the reference and of this my Award and Special Case.'

The Special Case provided that if within 21 days of the Award notice should not be given by either party to the other of the intention to obtain the opinion of the Court, or if the party giving such notice should fail within 6 weeks thereof to set the Award down for argument before the Court as a Special Case, then in such case the Award was to become final and conclusive. Neither party having complied with this provision the Award thereby became final and conclusive.

(*Note*.—The above précis is made by the courtesy of the National Federation of Building Trades Employers.)

Book Reviews

Architects' Working Details, ed. by *D. A. C. A. Boyne*. Vol. i. 11¼ in. 159 pp. incl. (148) pls. Archtl. Press. 1953. £1 1*s*.

The first volume of a projected series intended to provide architects with an up-to-date reference library of useful details, this book comprises a selection of the material published under the heading Working Details in the ARCHITECTS' JOURNAL. The subjects include windows, doors, staircases, walls and partitions, roofs and ceilings, furniture and fittings, balconies, covered ways, canopies, and heating. The book is one of about five or six architectural books which have been chosen for the Exhibition of Book Design 1954. It richly deserves this distinction. The production is most attractive and the special type of binding, which enables every page to open flat on the desk or drawing board, appears to be thoroughly successful. J. C. P.

Indoor Plants and Gardens, by *Margaret E. Jones* and *H. F. Clark*. *Patience Gray*, ed. *Gordon Cullen*, illus. 8½ in. 154 pp. incl. pls. and pp. of illus. text illus. Archtl. Press. 18*s*.

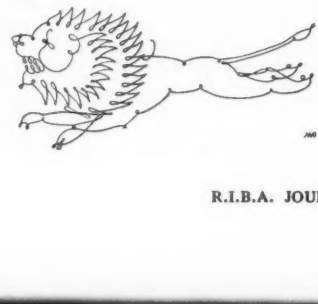
This book is a very good outline of what the architect needs to know about indoor plants. It is written by a landscape architect and a horticulturist, and illustrated by Gordon Cullen with some of the most beautiful drawings of plants that one can imagine. It shows a welcome interest in the shape and form of plants, as well as in the fun of growing them for their own sake.

After a short introductory history of the taste for indoor plants, the authors briefly set out the main principles of indoor gardening, and then devote the main part of the book to an illustrated dictionary of the most useful species with notes on the cultivation and propagation of each, ending with a chapter on the arrangement of plants and forty pages of photographs of indoor plants in use. There is an appendix with lists of plants for various situations, a list of plant suppliers, and a bibliography.

I think the list of plants is on the whole a very good one. If anything, it errs on the side of including some which might be rather difficult to grow, especially a few which I think are greenhouse plants in that they like plenty of light and a damp atmosphere, rather than room plants which must put up with shade and a dry atmosphere. PETER SHEPHEARD [*A*]

Calculation, Design and Testing of Reinforced Concrete, by *K. L. Rao*. 2nd ed. 8½ in. xv + 424 pp. text diags. Pitman. 1953. £1 15*s*.

This is the second edition of a book which covers the syllabus for the B.Sc. Engineering Degree and the Associate Membership of the Institution of Civil Engineers and the Institution of Structural Engineers. The three sections are devoted to theory, experimental tests, and simple designs of, for example, water-towers and retaining walls, raft foundations and shell roofs. Examination candidates should find useful the questions taken from recent papers: some are given, with answers, as examples; some, without, as exercises.



Notes and Notices

NOTICES

The R.I.B.A. Appointments Department. Members and Students of the R.I.B.A. and the Allied Societies are reminded that the services of the Institute's Appointments Department are available to employers requiring assistants and to assistants seeking salaried employment.

Employers are invited to notify the Secretary of vacancies in their offices, giving details of the work to be done, the qualifications required, and salaries offered.

Assistants should preferably call at the offices of the Appointments Department, but if this is not practicable they should obtain from the Secretary an application form, which when completed and returned to the Institute will enable the Department either to send the applicants particulars of vacancies suitable to their qualifications and requirements or submit their names for vacant posts.

Members and Students seeking official appointments should note that normally these are fully advertised in the weekly professional press, and that therefore the Appointments Department do not as a rule notify them to those on the register.

The Institute will also be glad to advise on most matters concerning architectural employment, including overseas appointments.

R.I.B.A. Forms of Agreement for General Use between Building Owner and Architect. The previous R.I.B.A. Form of Agreement for General Use between a Building Owner (including a Statutory Authority) and a Firm of Architects has now been reprinted in two separate editions, one applicable to a building owner other than a statutory authority and the second applicable to a building owner who is a statutory authority.

The two Forms of Agreement are based upon the R.I.B.A. Conditions of Engagement and Scale of Professional Charges revised June 1954, and are entitled as follows:

Form of Agreement for General Use between a Private Building Owner and an Architect or a Firm of Architects.

Form of Agreement for General Use between a Building Owner (being a Statutory Authority) and an Architect or a Firm of Architects.

Copies of each Form are obtainable from the offices of the Royal Institute (price 6*d.* per copy, by post 9*d.*).

Cessation of Membership. Under the provisions of Bye-law 21 the following has ceased to be a member of the Royal Institute: *as Licentiate*—Walter Leslie Reeve-Smith.

COMPETITIONS

Low Prize Competition. The Illuminating Engineering Society offers a prize which will be awarded to the winners of a competition intended to encourage collaboration between students of illuminating engineering or of those branches of engineering concerned with illumination, and students in other fields in which applied lighting plays an important part. While entries from individuals are not excluded, the competition is primarily intended for students (under the age of 26) working in collaboration. The competition will be set and judged by a panel of assessors appointed by the Society in co-operation with the R.I.B.A. and the Institution of Electrical Engineers.

Premium: £75 (and a certificate to each member of the winning team).

Certificates of commendation will be awarded to any other entries of outstanding merit.

Last day for submitting designs: 15 November 1954.

Forms of application and instructions as to the form which entries should take may be obtained from the Secretary of the Illuminating Engineering Society, 32 Victoria Street, London, S.W.1.

Church and Church House at Liverpool. The Liverpool Diocesan Reorganisation Committee invites architects to submit designs in competition for a new Church House and Chapel on the site of St. Luke's Church, Berry Street, Liverpool.

Assessor: Sir Giles Gilbert Scott, O.M., R.A. (Past-President).

Premiums: £800, £400, £200.

Last day for submitting designs: 16 December 1954.

Last day for questions: 16 September 1954.

Conditions may be obtained on application to P. Straw, Secretary, Liverpool Diocesan Reorganisation Committee, Church House, 47 Moorfields, Liverpool, 2.

Deposit, £2 2*s.* 0*d.*

BOARD OF ARCHITECTURAL EDUCATION

The Final Examination, June 1954. The Final Examination was held in London, Leeds, Manchester, Newcastle, Edinburgh and Belfast from 16 to 25 June 1954. Of the 447 candidates examined, 198 passed as follows:—

Passed whole Examination	132
Passed whole Examination, subject to approval of Thesis	11
Passed Part 1 only	55
	198

249 candidates were relegated.

The successful candidates are as follows:—

Whole Examination

Abadie: R. N.
Advice: A. R. P.
*Ashley: Raymond
Askew: G. A.
Austin: W. M.
Baldwin: S. F.
Barber: Philip
Bates: M. P.
Bavle: D. M.
Beaghen: Patrick
Belchambers: E. E.
Blair: K. V.
Blewett: Peter
Brimicombe: J. J. M.
Brown: Colin
Burnett: A. J.
Butchers: P. G.
Calnan: P. T.
Cash: G. J.
Chamberlain: A. G.
Clubley: J. D.
Collins, J. S.
Crawforth: C. P.
Crawforth: N. D.
Dann: N. C.
Davis: H. E. L.
Dean: J. M.
Delia: A. R. F.
De Rusett: B. W.
Dickins: R. H.
Dixon: F. G.
Dukes: E. G. (Distinction in Thesis)
Edmundson: R. S.
Edwards: W. B.
Elkerton: W. J.
Ellott: G. J.
Engleback: N. W.
Entwistle: D. K.
Ferguson: A. R.
Field: D. L.
Fitzhardinge: R. G.
Gardner: J. T.
Garwood-Jones: T. P.
Gilbert: M. W.
Gillings: R. J. W.
Gould: M. J.
Goulty: J. F.
Graham: R. C.
Green: M. E.
Gribble: R. A.
Griffiths: K. F.
Grist: M. W.
Groves: P. D. B.
Guy: R. L.
Hale: P. W.
Haskell: J. C.
Haworth: W. P.
Hector: J. C.
*Henshaw: Patrick
Hindson: D. J.
*Hoare: R. W. C.
Hobbis: C. E.
Hobby: D. J.
Holloway: D. R.
Hook: B. C. C.
Hughes: Peter
Hutchins: N. D.
James: F. G.
Jennings: G. M.
Jeruzalski: T.
Johnston: R. E.
Johnston: T. J.
*Jones: Donovan W.
Jones: Eric (Distinction in Thesis)
Jones: J. E. V.
Jones: Leonard D.
Keating: M. N.
Kerly: F. R.
King: John
Kitney: Deryk
Lane: K. W.
Langham: G. K.
Larkin: W. E.
Latham: M. E.
Latimer: J. R.
Lazzeri: A. G.
Lorenowicz: B. W.
*McCall: A. R.
Manning: C. F.
Mason: C. E. (Distinction in Thesis)
Mathias: J. W.(Miss)
Meredith: B. N.
Monk: M. R. W.
Morgan: A. K. W.
Mulchinock: M. G.
Nixon: P. L.
Nuttall: P. R.
Parkman: G. P.
Patton: N. B.
Peachment: S. W.
Pearce: R. C.
Porter: R. P. R.
Pugh: D. E.
*Pye: K. G.
Quinton: R. J.
Rappoport: Sydney
Roden: J. C.
Roe: R. K. B.
Ross: A. H.
Ross: I. G.
Ruchlewicz: M. S.
Ruffle: David
*Sargant: K. P.
Sharpe: J. B.
Sierakowski: K.
Simmonds: J. M.
Simpson: B. M.
Skeates: B. G.
Slingo: G. P.
Sliwa: J. A.
Smith: John J. M.
*Smith: Kenneth P.
*Soanes: B. H.
Spencer: Alan (Distinction in Thesis)
Staley: J. G. (Miss)
Stanley: Noel
Stout: Roy
Sugden: B. H.
Sutcliffe: S. R.
Vale: R. H.
*Waite: Donald
Warburton: Brian
Ward: B. P.
Wells: Raymond
Wells-West: K. H.
Wheeler: M. S. H.
White: Ronald
*Whittaker: Eric
Williams: R. G.
Wilson: Donald
Woodford: N. L.
Worskett: R. R.
Monk: M. R. W.
Young: P. A. G.

* Subject to approval of Thesis.

Part 1 only

Abbott: D. J.
Bell: Edward
Braithwaite: J. E.
Branch: D. C.
Brooks: J. G.
Brown: Bryan G.
Bryans: J. K.
Catt: D. C.
Corlett: F. B.
Davis: C. J. L.
Dell: Kenneth
Dixon: P. G.
Durell: L. A. (Miss)
Fineberg: Basil
Foster: K. W.
Gregory: D. G. R.
Grogan: E. M.
Hamilton: A. S.
Hardy: M. C.
Herrick: J. A.
Holmes: G. I.
Hopkins: R. J. A.
Krishnaswamy: P.
Lewicka: J. (Miss)
Milner: W. S.
Moore: J. M.
Morgan: Alun
Morhaim: N. O.
Morriss: Terence
Panter: K. H.
Parry: R. G.
Partridge: G. J.
Porter: S. H.
Sale: R. W. I.
Sharpe: D. M. C.
Simpson: P. L. (Miss)
Somkowicz: T.
Southin: Christopher
Stanley: R. L.
Strutt: A. W.
Sture: J. H.
Sturmer: J. A.
Szanski: M. J.
Taylor: P. R.
Thompson: R. P.
Twells-Grosse: J. D.
Vasbenter: A. L.
Webb: K. L.
Weitzel: A. H. R.
West-Jones: Alan
Wheatley: J. R. G.
Whitebread: W. J. F.
Wloczewska: N. (Miss)
Wood: H. D.
Wyka: Z.

The Special Final Examination June 1954. The Special Final Examination was held in London, Leeds, Manchester, Newcastle, Edinburgh and Belfast from 16 to 25 June 1954.

Of the 302 candidates examined, 87 passed as follows:—

Passed whole Examination	73
Passed Part 1 only	14
	87

215 candidates were relegated.

The successful candidates are as follows:—

Whole Examination

Adams: Anthony
Asarpota: L. D.
Bagguley: R. W.
Baker: C. de L.
Baron: Geoffrey
Bradley: M. H.
Bradshaw: P. J. D.
Brown: Albert J. S.
Burgess: C. S.
Carruthers: D. B. L.
Cheverton: David
Daley: P. A. F.
Daly: Malachy
Davies: W. H.
Dutton: R. T. H.
English: D. O.
Fahey: P. P.
Franco: Alfie
Gammans: H. C.
Gibson: J. A.
Glover: J. E. S.
Graham: G. G.
Gregson: Ralph
Grinsted: J. R. H.
Hallam: R. W.
Heptonstall: Donald
Jacobs: L. I.
Jolly: J. E.
Kinross: John
Kirk: I. C.
Lam: P. Y. Y.
Lannigan: Samuel
Lee: A. H.
Lenartowicz: J. Z.
Leonard: H. H. A.
Looker: K. P. J.
Luckman: S. J.
Luetchford: D. M.
McBride: J. C.
MacMinn: John
Millar: Walter
Miskin: G. M.
Murray: A. C.
Murray: James
Rankin: E. N.
Reed: D. A.
Reeves: A. W. J.
Richardson: R. J. H.
Riley: Frank
Rogers: Leonard
Rummery: D. A. H.
Scott-Williams: Gerard
Sellick: F. P.
Selves: L. W.
Silverwood: A. W.
Simpson: B. J.
Singleton: Peter
Skyner: R. S.
Stanley: R. F.
Stirratt: W. C.
Swann: V. Z.
Throssell: E. R.
Tucker: J. R.
Turpin: J. W.
Walker: Ralph
Wareham: J. K.
Watts: M. J.
Weaver: L. J.
Weir: James
Wilde: R. G.
Wiles: H. G.
Wilson: K. H.
Yellowlees: B. V. I.

Part 1 only

Collins: L. O.
Cork: A. J. F.
De Donten: J. R.
Elliott: B. C.
Ellis: R. A. C.
Gilonis: B. A.
Goodfellow: R. E.
Hickling: Cliffe
Hinds: W. R. J. S.
Sewell: R. F.
Simmonds: H. C.
Stovin-Bradford: F. R.
Walker: R. E.
Yap: P. V.

The following candidates have also passed the Special Final Examination:—

Burgoine: R. C.
Dickinson: R. G.
Francis: J. W.
Naden: F. R.
Spashett: E. T.

R.I.B.A. Maintenance Scholarships in Architecture. The following Maintenance Scholarships have been awarded for the year 1954–1955:

An R.I.B.A. Howe Green 4th and 5th Year Maintenance Scholarship of £40 per annum awarded to J. F. Flanders of London, S.E.9.

An R.I.B.A. Houston Maintenance Scholarship of £125 per annum to D. M. Smith of London, N.21.

The Maintenance Scholarships previously awarded to the following candidates have been renewed:

D. S. Bremner (Aberdeen School of Architecture, Robert Gordon's Technical College—R.I.B.A. Houston Maintenance Scholarship of £125 per annum).

B. E. Clack (School of Architecture, The Polytechnic, Regent Street, London—R.I.B.A. Houston Maintenance Scholarship of £125 per annum).

J. D. Connell (Department of Architecture, Northern Polytechnic—R.I.B.A. Houston Maintenance Scholarship of £125 per annum).

A. G. H. Morrow (Department of Architecture, Northern Polytechnic—R.I.B.A. Houston Maintenance Scholarship of £125 per annum).

W. B. Sidnell (Bartlett School of Architecture, University of London—R.I.B.A. Houston Maintenance Scholarship of £125 per annum).

K. W. Barnes (School of Architecture, The Polytechnic, Regent Street, London—R.I.B.A. 4th and 5th Year Maintenance Scholarship of £60 per annum).

A. G. Diprose (Architectural Association, School of Architecture—Ralph Knott Memorial Maintenance Scholarship of £45 per annum).

P. G. Wentworth-Sheilds (Architectural Association, School of Architecture—THE BUILDER Maintenance Scholarship of £75 per annum).

ALLIED SOCIETIES

Changes of Officers and Addresses

The Wilts and Dorset Society of Architects. Hon. Secretary, L. V. Bacon [*A*], Polebarn House, Trowbridge, Wilts.

Correction. In the July issue of the JOURNAL Mr. Peter J. Ball [*A*] was incorrectly given as the Hon. Secretary of the Northamptonshire, Bedfordshire and Huntingdonshire Architectural Association. He is Hon. Secretary of the *Huntingdonshire Branch*, and Mr. J. T. B. Neville [*L*] remains Hon. Secretary of the Association.

GENERAL NOTES

R.I.B.A. Cricket Club. *R.I.B.A. v. Blue Circle*, 13 *July* 1954.

Result

R.I.B.A.

A. Marlow, run out	25
J. G. Batty, b. Jefferies	22
B. S. Smyth, c. Mullins, b. Lovell	1
G. Fyson, c. Gellatly, b. Jefferies	23
G. Sekara, c. Gellatly, b. Jefferies	0
C. A. R. Norton, c. Gellatly, b. Jefferies	8
D. S. Taylor, b. Jefferies	19
G. Ringshall, run out	8
R. R. Fairbairn, c. Mullins, b. Jefferies	0
J. Baverstock, not out	4
R. Case, l.b.w. Jefferies	0
Extras	6
Total	116

Jefferies 7 for 29; L. Lovell 1 for 28.

Blue Circle

A. C. Clark, stumped Baverstock, b. Batty	34
G. N. Mullins, run out	7
R. W. Gellatly, b. Norton	29
G. A. Wright, l.b.w. Batty	0
A. C. Lowen, not out	17
L. D. Hawkins, not out	27
Extras	6
Total (4 wkts.)	119

J. G. Batty 2 for 23; C. A. R. Norton 1 for 28. The Blue Circle won by 6 wickets.

Notes from the Minutes of the Council

MEETING HELD 6 JULY 1954

1. Appointment of Honorary Officers for the Session 1954–1955. Mr. F. Charles Saxon [*F*], having been appointed Chairman of the Allied Societies' Conference, becomes a Vice-President under the provisions of Bye-law 28. Messrs. E. D. Jefferiss Mathews [*F*] and S. Rowland Pierce [*F*] were re-appointed Vice-Presidents and Mr. Basil Spence [*F*] was newly appointed. Mr. Kenneth M. B. Cross [*F*] was re-appointed Honorary Secretary and Mr. Thomas E. Scott [*F*] was re-appointed Honorary Treasurer.

2. Appointments. (*A*) *R.I.B.A. Representatives on National Consultative Council of the Building and Civil Engineering Industries for Year beginning 1 July* 1954. Mr. Michael Waterhouse [*F*] was nominated for re-appointment by the Minister of Works and Mr. E. D. Jefferiss Mathews [*F*] was nominated for appointment as the second representative in place of Mr. P. G. Fairhurst [*F*]. (*B*) *University of Hull: R.I.B.A. Representative on Court of Governors.* Mr. Andrew Rankine [*A*]. (*C*) *Darlington College of Further Education: R.I.B.A. Representative on Board of Governors.* Mr. T. V. Deas [*A*] re-appointed.

3. New Members and Retired Members of Council. The President extended a welcome to the new members of the Council, and on his proposition a vote of appreciation of the services of those members who had retired since the last meeting was passed unanimously.

4. The Honorary Fellowship. The Right Hon. Vincent Massey, C.H., Governor-General of Canada, has accepted the Council's nomination for election to the Honorary Fellowship. Mr. Massey's name had been put forward by the Council of the Royal Architectural Institute of Canada.

5. Christmas Holiday Lectures for Young People. The Council invited Mr. Basil Spence [*F*] to give two Christmas holiday lectures for young people at the Royal Institute during the Christmas period, 1954.

6. Mr. Bernard Matthews [*F*]. The Council sent their congratulations to Mr. Bernard Matthews [*F*], Honorary Consul-General for Greece in Calcutta, on the award by H.M. The King of Greece of the Order of George I, Decoration of Gold Cross.

7. Composition of Subscriptions for Life Membership. The Council considered a report prepared by the Finance and House Committee after a full review of the financial aspects of the existing scheme for composition of subscriptions for life membership. It was decided that no further compositions for life membership should be accepted.

8. Membership. The following members were elected: as Associates 13.

9. Students. 172 Probationers were elected as Students.

10. Applications for Election. Applications for election were approved as follows: *Election 12 October* 1954: as Fellows 10; as Associates 87; as Licentiates 4. *Election* 2 *November* 1954 *(Overseas Candidates):* as Fellow 1; as Associates 5.

11. Applications for Reinstatement. The following applications were approved: as Associate, Adam Adolf Gelister; as Licentiate, Charles Cayley.

12. Resignations. The following resignations were accepted with regret: Gordon Raphael Bonella [*A*], Ronald Robert John Tasker [*A*], Arthur Appleby [*L*], Arthur Ewart Aston [*L*], Walter William Bull [*Ret. L*].

13. Application for Transfer to Retired Members' Class under Bye-law 15. The application of William Pendleton for transfer to the class of Retired Licentiates was approved.

14. Obituary. The Secretary reported with regret the death of the following members: George Willis Grey [*F*], Frederick John Osborne Smith [*Retd. F*], Joseph Charles Gustave Brault [*A*], Douglas Chantler Leigh [*Retd. A*], Albert George Harrison [*Student*], Brian Maurice Simpson [*Student*].

By resolution of the Council the sympathy and condolences of the Royal Institute have been conveyed to their relatives.

Obituaries

Thomas Smith Tait [*F*] died on 18 July, aged 72.

'Tommy' Tait was born in Paisley, the son of a master stone-mason. He studied at the Paisley Technical College and the Glasgow School of Art and, later, at the Royal Academy Schools in London. He served his articles with Mr. James Donald, who had been chief draughtsman to Greek Thomson, and the influence of Greek Thomson is apparent in Tait's designs. Tait then became assistant to Sir (then Mr.) John Burnet and, later, partner. After Sir John's retirement he became senior partner in the firm of Sir John Burnet, Tait and Partners.

With Sir John, Tait worked on King Edward VII gallery, British Museum; Kodak House, Kingsway; Adelaide House, London Bridge; Unilever House, Victoria Embankment; Lloyds Bank, Lombard Street (London Architecture Bronze Medal, 1932); Mount Royal, Marble Arch; The DAILY TELEGRAPH building, Fleet Street; the Second Church of Christ Scientist; the extension of Selfridge's, Oxford Street; Vigo House, Regent Street; and war cemeteries and memorials for the Imperial War Graves Commission in Palestine. Of the buildings which can be attributed to Tait alone, the following are the principal: St. Andrew's House government building in Edinburgh; the Empire Exhibition at Glasgow in 1938; Paisley hospital for infectious diseases; the Royal Masonic hospital at Ravenscourt Park (London Architecture Bronze Medal 1934); the Burlington school for girls at Hammersmith; Messrs. Dingle's new store at Plymouth; the new Colonial Office, London; and the pylons of Sydney Harbour bridge.

In 1934 he was appointed to a committee set up by the Secretary of State for Scotland to advise on housing, and during the recent war was Director of Standardisation at the Ministry of Works.

A brilliant draughtsman and an acute observer, Tait seemed able to absorb and reproduce ideas from any source. Although capable of original thought, as witness his early expression of a steel-framed building in Kodak House in Kingsway, he seemed to be at home in any manner of design. Yet his work could never be labelled copyist; he often took ideas from others, but gave them the impress of his own personality and sense of design. There was a kind of humility in this—his nature held no trace of self-conceit or arrogance—and he seemed to think of himself as one of a body of architects who held a common stock of ideas from which anyone could borrow. Thus there was never a 'Tait manner' of design. Each building was a special problem and if, after it was built, the critics chose to find traces of Egypt, New York or Hilversum in it, Tait was quite unconcerned. Nor, in the eclectic twenties, did anyone else mind very much; in those days the practice of architecture was not a serfdom to creeds. Tait's buildings might be criticised, but they could not be ignored. Each was individual, exactly suited to its site and function and executed with business-like precision. They showed no trace of hasty thought or poor judgment; like Tait himself, they were efficient, calm, dignified and kindly.

The practice is carried on by his son, Mr. Gordon Thomas Tait [*F*], at 10 Bedford Square, W.C.1.

Edgar Sefton Underwood [*F*] died on 29 April, aged 90.

Mr. Underwood was born in the north of England but came to London as a child. He was in due course articled to Mr. William Bliss Sanders, and began practice in the City in 1896. He was elected Fellow of the Institute in 1905. He had a wide general practice and specialised in the repair of old buildings damaged by dry rot and beetle. He was an authority on the history of the church of St. Mary-le-Bow, of which he was surveyor for many years. He was a keen artist, musician, archaeologist and sportsman, and also very active in the affairs of the City. For thirty-seven years he was a member of the Court of Common Council. In 1906 he was elected a member of the Ward of Cheap Club and later held the offices of secretary and treasurer, and in 1926 he was admitted to the Livery of the Gold and Silver Wyre Drawers of the City of London.

Douglas Lindsay Crawford [*A*] died on 12 November 1953, aged 53.

Mr. Crawford studied at the Glasgow School of Architecture and served articles with Mr. A. N. Paterson [*A*], of St. Vincent Street, Glasgow. He practised in Greenock and district, beginning in 1930. Among his works were premises for the Union Bank of Scotland in Gourock and Greenock, new dairies for the Greenock Central Co-operative Society, a hall and club rooms for the Y.W.C.A. in Greenock and alterations to the Greenock B.B. cinema.

Percy Edward Hale [*A*] died on 28 May, aged 66.

Mr. Hale served his articles with the late John Elphick and then went as assistant to Messrs. M. G. and O. H. Collins of Old Broad Street, London. He served in the R.N.V.R. through the first world war, then returned to Messrs. Collins as Chief Assistant, remaining until 1939. During this period he worked on a number of large City buildings, among them Furness House in Leadenhall Street, Stafford House in King William Street, the British General Insurance building in Cheapside, the Chartered Insurance Institute, Aldermanbury, and the Carreras Factory in Hampstead. On all these schemes Mr. Hale designed the steel structure, work in which he excelled.

In 1939 he was appointed to the Camberwell Borough Council, later becoming Chief Assistant Architect. In his private capacity Mr. Hale designed several private houses, in particular a small house and garage in the centre of Richmond, Surrey, in the Georgian tradition.

A former colleague, Mr. H. Burgess [*L*], says: 'He had a delightful personality and was at all times eager to help any colleague with valuable suggestions.'

Joseph Charles Gustave Brault [*A*], of Ontario, died on 7 May, aged 68.

Mr. Brault studied at Cornell University and for a short while was in private practice. In 1914 he entered Government service and remained in it throughout his life. From 1945 until his retirement in 1952 he was Acting Chief Architect to the Public Works Department in Ontario. He was elected Associate R.I.B.A. in 1913.

He was associated in town planning with M. Jacques Gréber.

Members' Column

This column is reserved for notices of changes of address, partnership and partnerships vacant or wanted, practices for sale or wanted, office accommodation, and personal notices other than of posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

APPOINTMENTS

Mr. John R. A. Sargent [*A*] has been appointed architect-in-charge of the Kilkenny office of Messrs. R. and W. Cunningham, Architects and Engineers, of Waterford, Eire, at 40 Parliament Street, Kilkenny, Eire. He will be pleased to receive trade catalogues, etc., at that address.

Mr. Donald A. Shanks [*A*] has been appointed Education Architect to the City of Belfast. His address is Education Offices, Academy Street, Belfast.

PRACTICES AND PARTNERSHIPS

Mr. A. J. Ardin [*A*] and **Mr. W. H. Robbins** [*A*] have dissolved partnership by mutual consent. Mr. Ardin will continue to practise at 129 Mount Street, London, W.1 (GROsvenor 7728) and Mr. Robbins will practise at No. 77 Wigmore Street, London, W.1 (WELbeck 0274/6).

The partnership between **Mr. D. H. Brown** [*A*] and **Mr. M. A. C. Simmonds, F.R.I.C.S.**, who practised under the style of Simmonds and Brown, has been dissolved by mutual consent. Mr. D. H. Brown will practise as from 1 September from Stone Street, Cranbrook, Kent (Cranbrook 3246), where he will be pleased to receive trade catalogues, etc.

Mr. R. Coulter Clark [*A*] has left the employment of Mr. Bernard Engle, Lincoln's Inn, and is joining as a partner the firm of **Messrs. Stenson and Hope,** 3A Park Street, Salisbury, Southern Rhodesia.

Messrs. Peter Dunham, Widdup and Harrison [*F*/*AA*] have opened a branch office at 77 High Street North, Dunstable, Beds. (Dunstable 1229), where they will be pleased to receive trade literature.

Messrs. Farmer and Dark announce that following the retirement of Mr. F. Q. Farmer [*F*] as a partner, Mr. Frankland Dark [*F*] has taken into partnership **Mr. Thomas A. Eaton** [*A*] and **Mr. William A. Henderson** [*A*]. The firm will continue to practise under the style of

Farmer and Dark. Mr. F. Q. Farmer remains consultant to the firm.

Mr. H. A. Halpern [*A*] has now entered into private practice at 27 Grange View, Leeds, and at 79 Balmoral Road, Gillingham, where he will be pleased to receive trade catalogues, etc.

The practice of the late Harold W. Moore [*F*] has now been incorporated in that of **Mr. Norman Green** [*F*] and will be carried on from 12 Adeline Place, Bedford Square, W.C.1 (LANgham 8577).

Mr. Denis Clarke Hall [*F*] has taken into partnership **Mr. H. S. Scorer** [*A*] for the purpose of opening a branch office under the name of **Clarke Hall and Scorer** [*F/A*] at 200 High Street, Lincoln (Lincoln 10734), where trade catalogues, etc., will be welcome.

Mr. G. W. Hardy [*L*] has opened an additional office at 478 Fulham Broadway, S.W.6 (FULham 4643), where he will be pleased to receive trade catalogues, etc.

The partnership of **Messrs. Joynt, Barton and Partners**, of 40 High Street, Camberley, Surrey, has been dissolved by mutual agreement. **Mr. H. Austin Barton** [*A*] will continue to practise from that address.

Mr. D. H. Leonard-Williams [*A*] has resigned (from 1 August) from the practice of **Messrs. Vyvyan Board and Leonard-Williams** on taking up training for Holy Orders. The practice will be continued by **Mr. Vyvyan Board** [*A*] on his own account, from the Plymouth and Salcombe offices.

Mr. A. McDougall [*L*] has become a partner in the firm of **Hill, Allum and Partner** [*F/L*], Southampton.

Mr. Peter Oldfield [*A*] and **Mr. H. G. Montgomerie** [*A*] are now in partnership at Lonrho Buildings, Baker Avenue, Salisbury, Southern Rhodesia.

Mr. Norman R. Riley [*A*] has begun practice at 106 Woodstock Road, Oxford (Oxford 55491) where he will be pleased to receive trade catalogues, etc.

Mr. Herbert Thearle [*F*] has taken into partnership his brother, **Mr. Laurence Bennett Thearle** [*A*]. The practice will continue under the name of Herbert Thearle, Chartered Architects, from 66 Rodney Street, Liverpool 1.

Mr. Paul H. Treadgold [*A*] and **Mr. Val Elsey** [*A*] have entered into partnership and are practising under the name of **Treadgold and Elsey** at 1 Vine Street, Uxbridge, where they will be pleased to receive trade catalogues, etc.

Mr. Graham Winteringham [*A*] has now opened an additional office at 15 Newhall Street, Birmingham, 3 (Telephone 3036/7), where he will be pleased to receive trade catalogues, etc.

CHANGES OF ADDRESS AND TELEPHONE NUMBER

Mr. R. T. Akers [*L*] has removed his Hampstead office from 1 Holly Hill, N.W.3, to Windmill Lane, Bushey Heath, Herts. (BUShey Heath 1330).

Messrs. Frederick Barber and Partners [*F/AA*] announce that their Kingston telephone number has been changed to Kingston 0011/12. The Dorking office number remains Dorking 4208.

Mr. Harold Baily [*F*] and **Mr. T. A. Sutcliffe** [*A*] have moved from their Adelphi office to No. 47 Whitehall, Westminster, S.W.1 (TRAfalgar 1488).

Mr. C. G. Boutcher [*F*] has retired from practice in Malaya and his permanent home address is now York House, Lower Frog Street, Tenby, Pembrokeshire.

Mr. E. L. Crawford [*A*] has changed his address to 8 Ashton Green, East Kilbride, Lanarkshire.

Mr. Albert Dale [*A*] has changed his address to c/o Public Works Department, Government of Alberta, Edmonton, Alberta, Canada.

Messrs. Elder and De Pierro [*F/A*] have moved to 80 Wimpole Street, London, W.1 (HUNter 0394).

Messrs. Elleray and Wallace [*AA*] have removed to new offices at Brockhurst House, Brockhurst Street, Northwich (Northwich 2647).

Mr. P. W. T. Elford [*L*] has changed his address to Sherwell House, Armada Street, Tavistock Road, Plymouth.

Mr. Michael E. Holt [*A*] has removed to 139 Sunnymead, West Green, Crawley, Sussex (Crawley 1911).

Mr. R. A. S. Holden [*A*] has changed his private address to 22 Mayfield Road, Moseley, Birmingham 13.

Mr. Peter D. Howell [*A*] has recently returned from a year's trip to Canada and the United States and will be pleased to receive trade catalogues, etc., again at his home address of 'White Croft', Kittle, Bishopston, Gower.

Mr. T. Maldwyn Jones [*A*] has changed his address to 1 Queen Square, Lancaster (Lancaster 5633).

Mr. Ward Koss [*A*] has changed his private address to 20 King's Avenue, London, S.W.4 (MACaulay 3657).

Mr. Alan C. Parnell [*A*] has moved to 44 Hilton Avenue, Friern Barnet, London, N.12, where he will be pleased to receive trade catalogues, etc.

Mr. John Reid [*A*] and **Mrs. Sylvia Reid** [*A*] have moved to 88 Talbot Road, Highgate, N.6 (MOUntview 7131).

Messrs. W. H. Watkins, Gray and Partners [*FF*] have removed from 19 Grosvenor Place to 57 Catherine Place, Palace Street, S.W.1.

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

Fellow returning from Scandinavia in autumn seeks partnership or position leading thereto. Southern England preferred (not London). Capital available. Box 67, c/o Secretary, R.I.B.A.

Two Associates with balanced experience, contemporary outlook and increasing volume of work in East Midlands seek junior partnerships in existing practice. Reasonable capital available. Box 77, c/o Secretary, R.I.B.A.

Associate (29), public school and university education, resident South Midlands industrial town, desires opportunity to open branch office for larger firm. Car owner. Capital available if required. Box 81, c/o Secretary, R.I.B.A.

Associate, Dip. Arch., age 30, public school, with experience in private and local authority offices, seeks partnership or position leading thereto in progressive country or town practice. Car owner with some capital available. Box 82, c/o Secretary, R.I.B.A.

Associate, 34, wishes to purchase an established London practice from a member about to retire. Arrangements could be made to carry on in semi-retirement. Ample funds to purchase a large practice either outright or in the form of an agreement. Box 84, c/o Secretary, R.I.B.A.

Associate (45), university trained, seeks partnership or position leading quickly thereto. Extensive varied experience, London or south preferred but would consider elsewhere. Some capital available. Box 86, c/o Secretary, R.I.B.A.

Practice required to purchase, London or West Country, Chartered Architect and Chartered Surveyor. Box 88, c/o Secretary, R.I.B.A.

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WANTED AND FOR SALE

Wanted. COUNTRY LIFE magazine, 3 June 1911 containing illustrated article by Muirhead Bone entitled 'A Glimpse of San Gimignano'. Box 79, c/o Secretary, R.I.B.A.

For sale. Two antiquarian drawing boards, one fitted with Holbro non-slip parallel motion. One double elephant drawing board and ebony edged T-square. Box 80, c/o Secretary, R.I.B.A.

For sale. Several ordnance maps of Goole and district in Yorkshire, also dumpy level, staff and tripod by Thornton. Can be seen near Leeds, Yorks. Box 83, c/o Secretary, R.I.B.A.

For sale. Houghton Butcher Director No. 1 (Mark 1) theodolite, two 7-ft. drawing office boards with trestles. Box 89, c/o Secretary, R.I.B.A.

For sale. Architect's desk, 4 ft. 6 in. long by 2 ft. 4 in. wide, mahogany, middle part winds up to form drawing board. Numerous drawers. 'Phone Lingfield 346.

ACCOMMODATION WANTED

Fellow seeks office accommodation in London (W.C.1 preferable). Would be willing to share existing office with facilities. Box 78, c/o Secretary, R.I.B.A.

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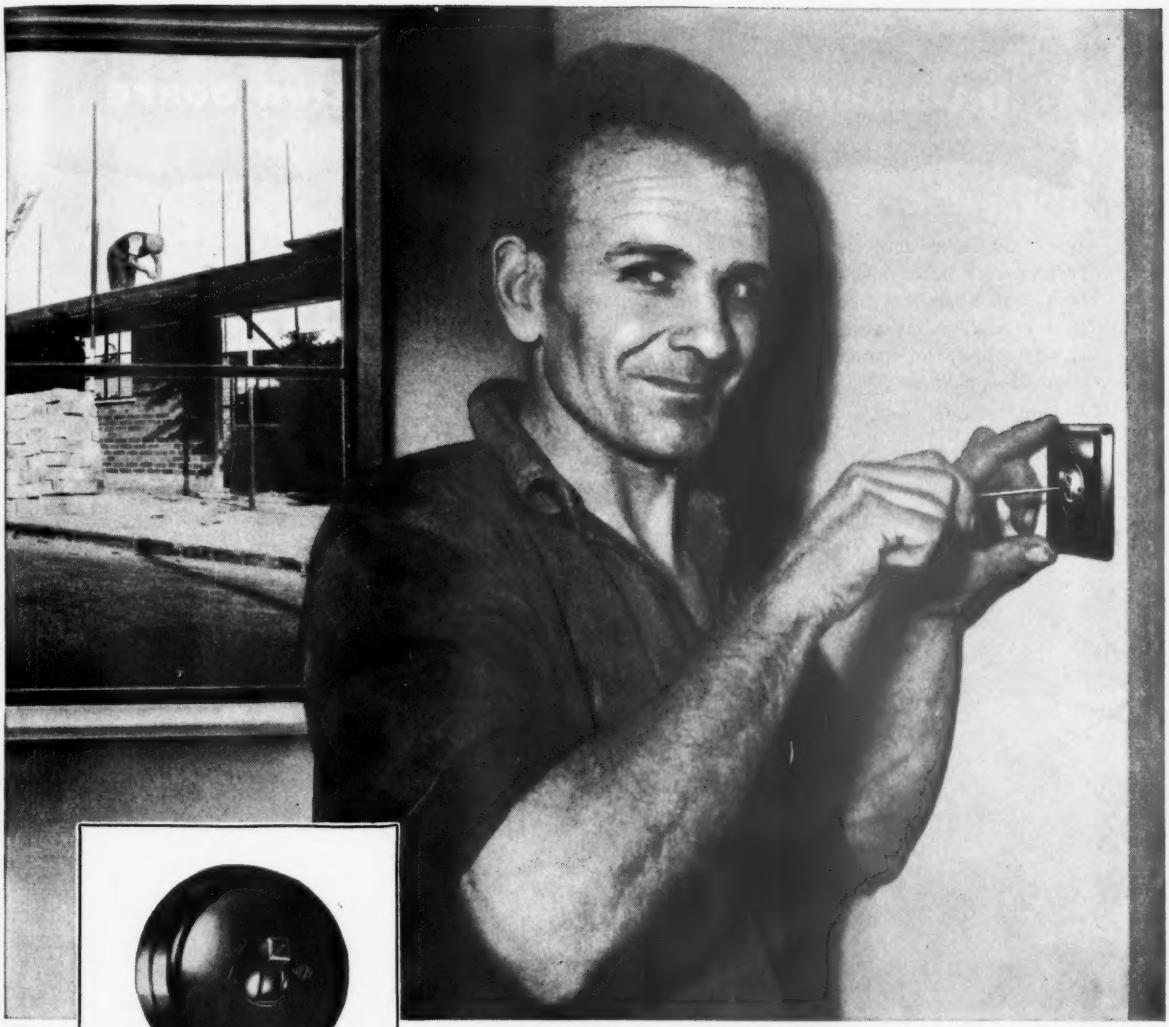

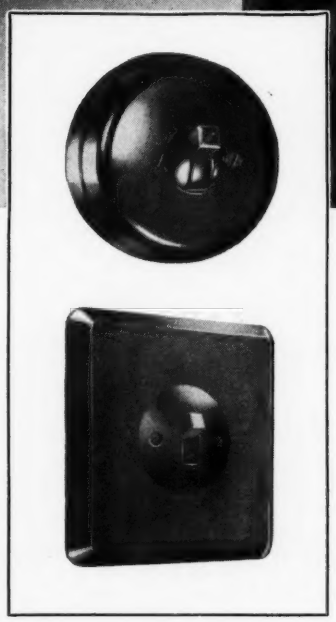

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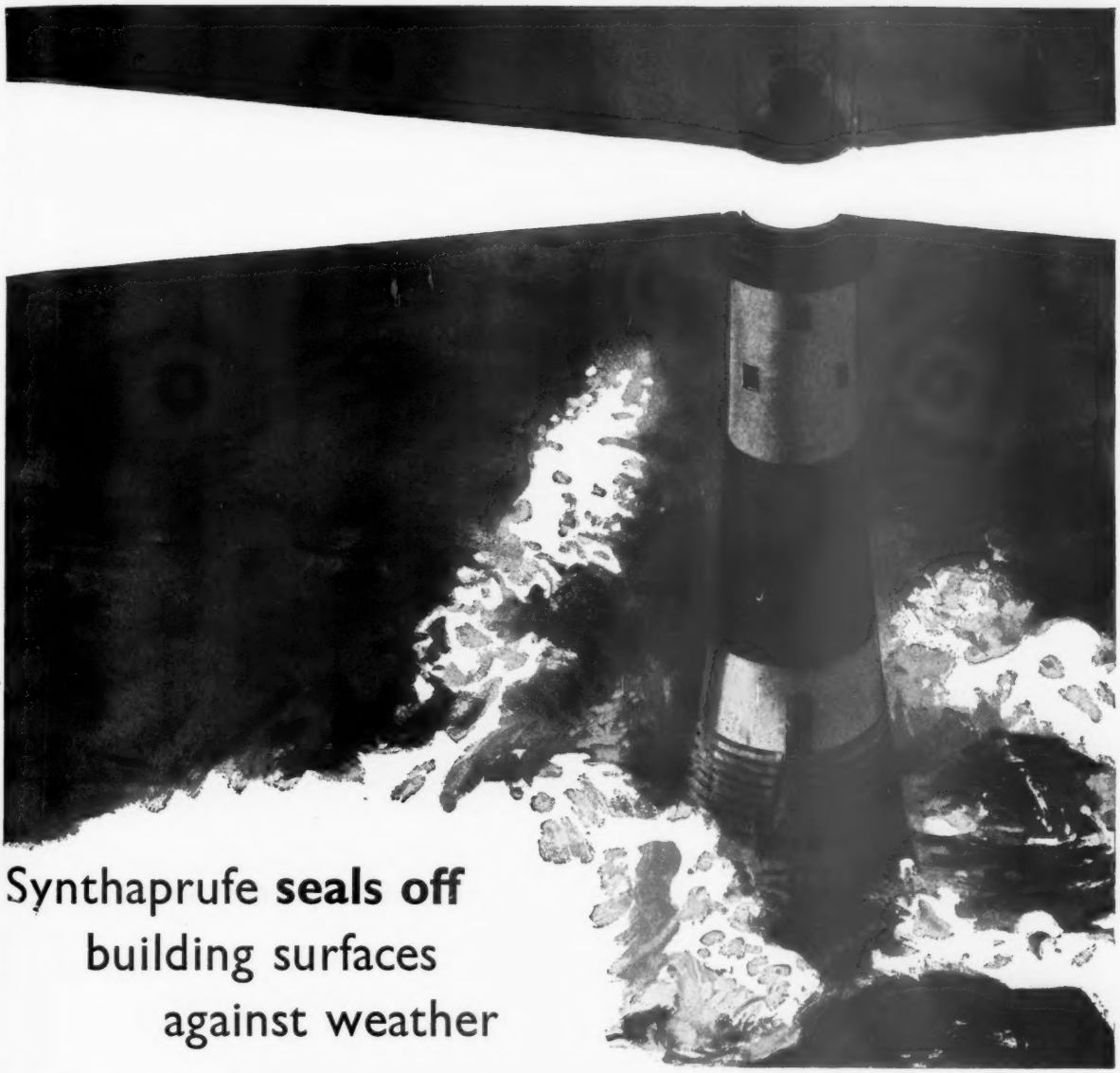

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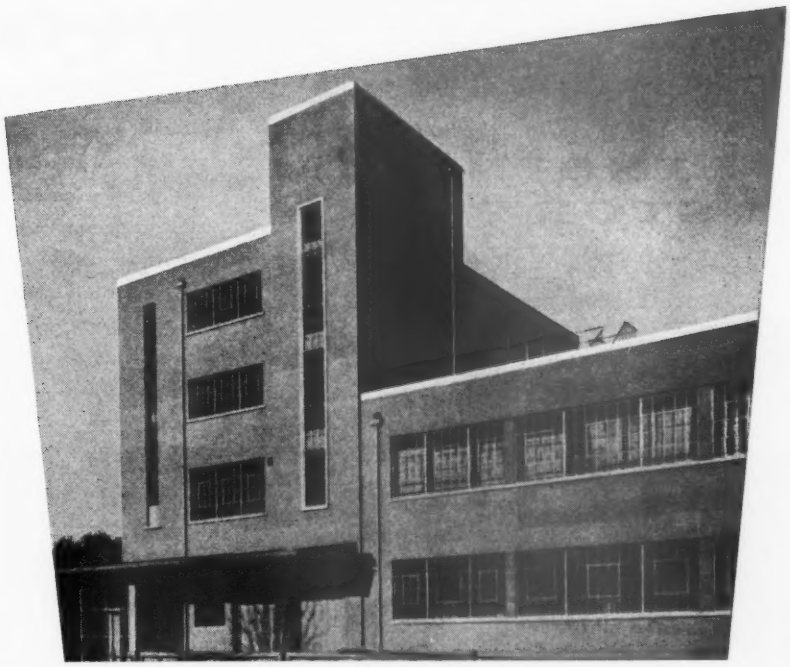

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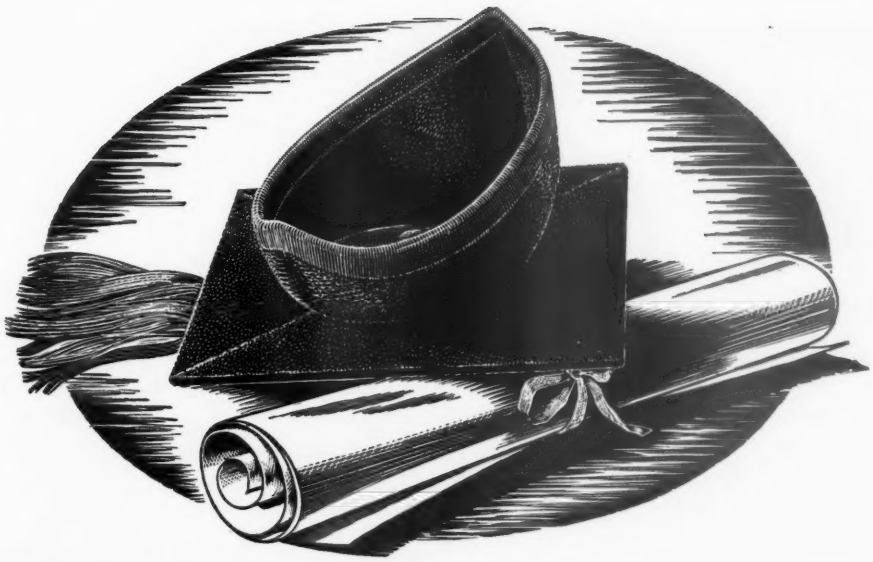

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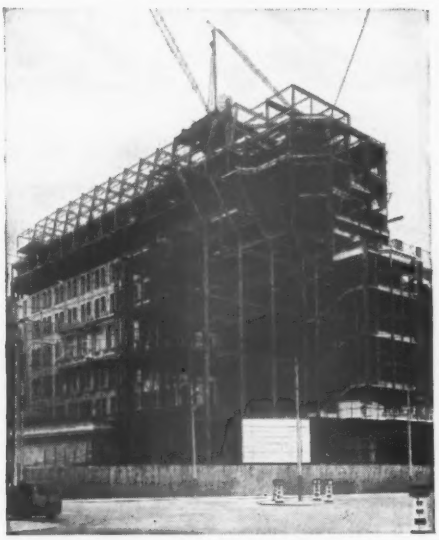

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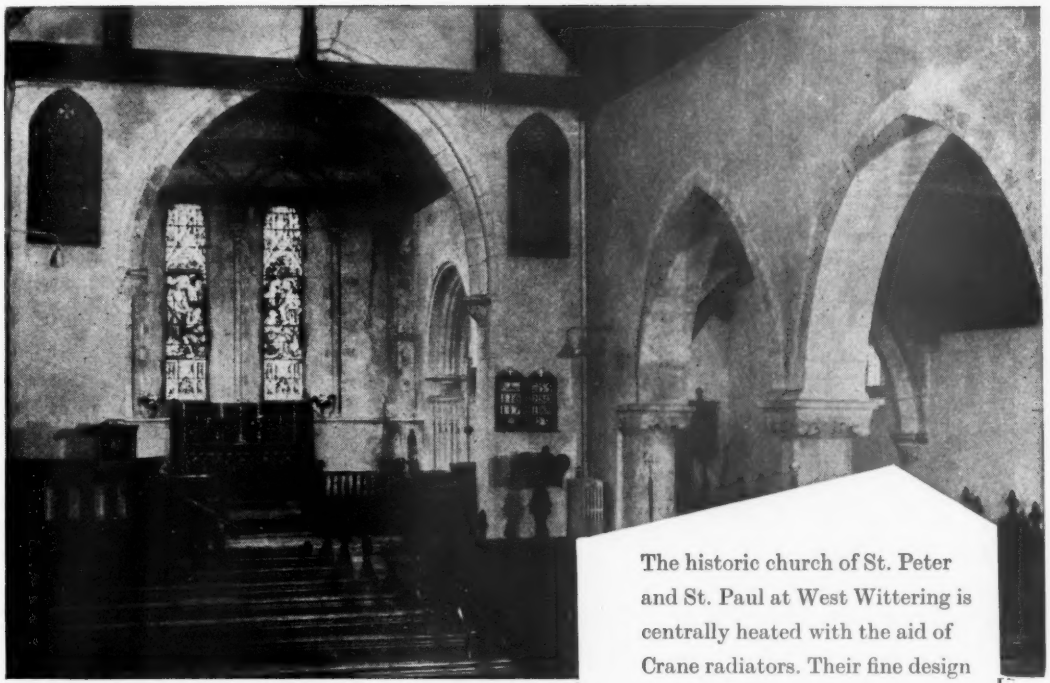

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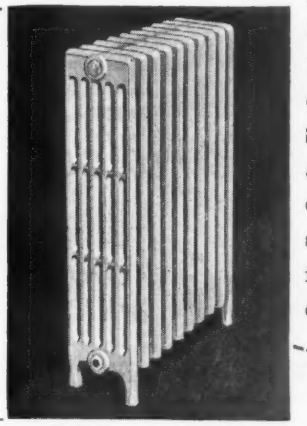

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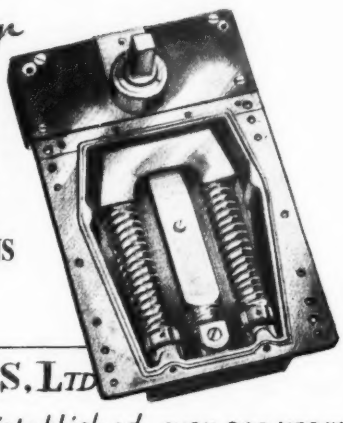

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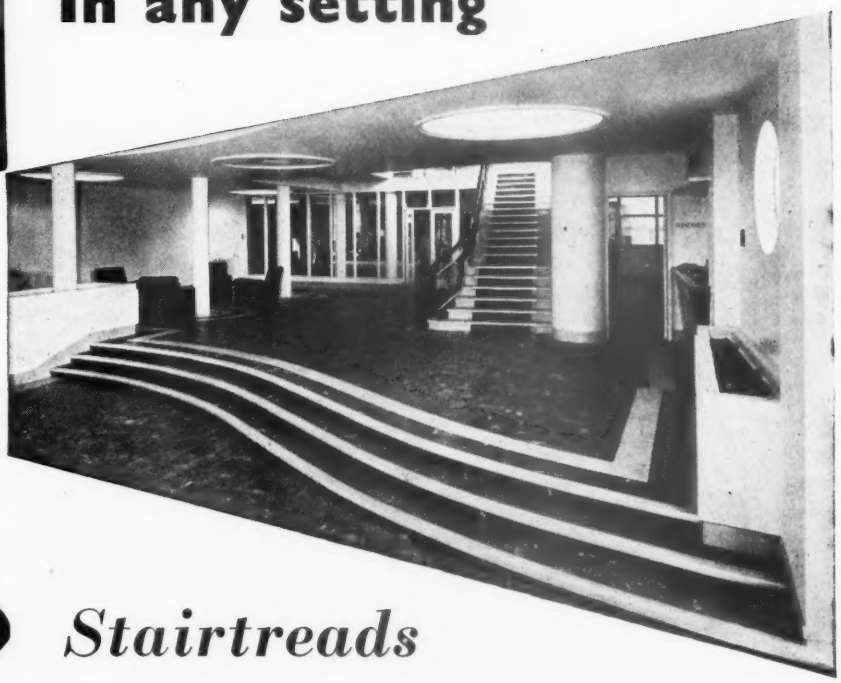

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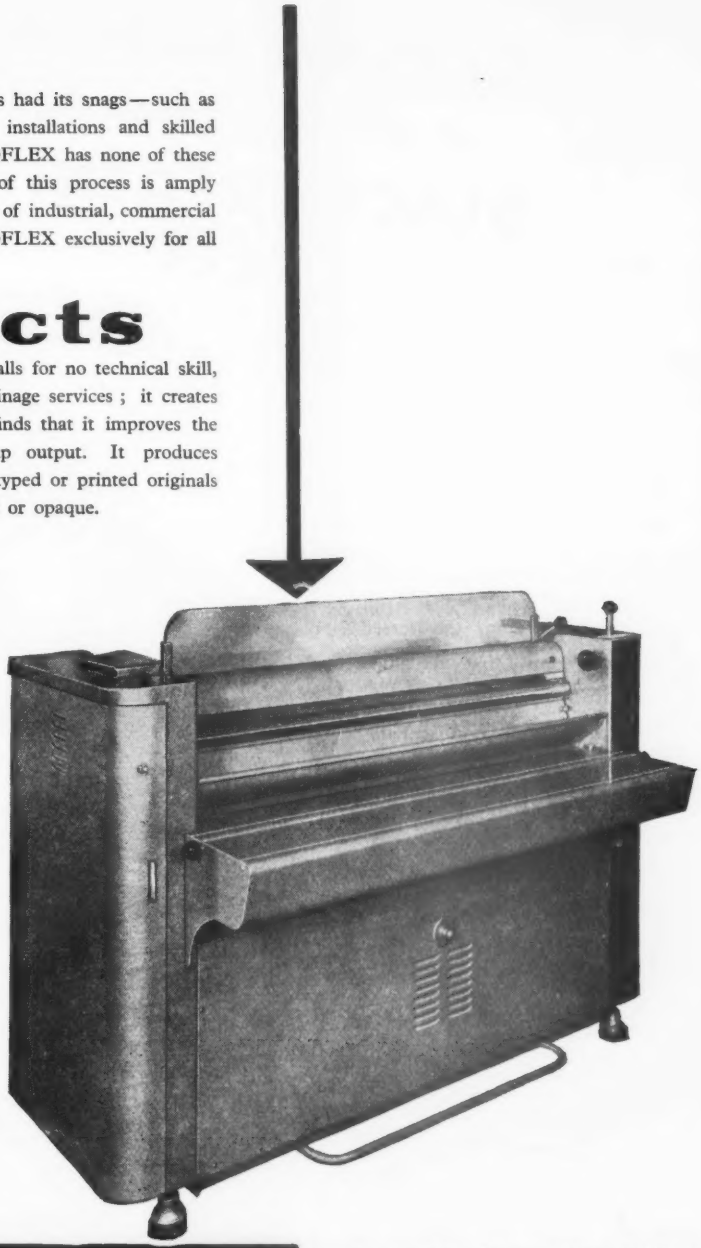

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Building Research Station Digest
No. 69

AUGUST, 1954

Avoiding Defects in Internal Plastering

Several recent publications have dealt with plastering materials, backgrounds and techniques. The Station still receives many enquiries about defects and failure in new work. This Digest therefore approaches the subject from a different angle: the underlying causes of failure, and the principles governing the design of plasterwork to avoid or to overcome them.

Many failures take the form either of cracking or of the plaster falling from the surface to which it has been applied. Apart from those caused by major structural movement, all these failures are determined by two interacting factors: differential movement between plaster and background, and the key, bond or adhesion between plaster and background.

If a wall shrinks on drying more than does the plaster applied to it, or if the plaster expands relative to the wall, there will be a tendency for the plaster to bulge away from its background. Conversely, if the wall expands or the plaster shrinks, there will be a tendency for the plaster to crack. In either case these tendencies may be counteracted by the adhesion between the two; if they are not, failure will occur.

Differential movement

The movements that occur in backgrounds may be the initial shrinkage as water introduced during construction dries out (high in materials containing cement), thermal movement (particularly in flat concrete roofs) or moisture movement following changes in humidity. To limit effects of drying shrinkage the background should be allowed to dry out before applying plaster. Thermal movement can be reduced to some extent by insulation and reflective treatments or can be accommodated by special design features. Moisture movement may be important with sheet materials.

Movement in the plaster coats is mainly due to setting expansion in the case of gypsum plasters or drying shrinkage in the case of cement or lime mixes. The extent of the movement of various plaster mixes is indicated in Table 1. The actual movement of a plaster coat on a background depends on the restraint offered by the background and on the adhesion.

Adhesion

That plaster sticks to most surfaces is a matter of common observation, but this property may not always be sufficient to keep plaster in place. Surfaces of brickwork or concrete should give some mechanical key; this is best provided when the background is built, e.g. by raking out joints in brickwork, by casting concrete against a formwork lining that gives an undercut key. Other means by which adhesion can be improved are discussed later.

The suction of the background, if not controlled, may affect adhesion. An absorbent background, the surface of which is too dry, will absorb too much water from the plaster; this will interfere with the setting and will produce a friable layer that gives poor bond. It must be left to the plasterer to adjust the suction by wetting the surface.

Key between plaster coats is important. It is customary to scratch undercoats before they have fully hardened to provide mechanical key for the next coat. The method of application of the mix influences the adhesion; if thrown on, the mix will stick better than if applied by trowel and advantage is taken of this in the application of a spatterdash coat.

TABLE 1

SOME CHARACTERISTICS OF PLASTER MIXES

Mix	Shrinkage or Expansion	Strength and Hardness	Remarks
LIME AND CEMENT Lime/sand	**All shrink on drying. Too much clayey or fine material or sands of uniform particle size make for high shrinkage. Content of clayey or fine material should not exceed 5 per cent. Strong mixes tend to develop a few large cracks; weaker mixes, finer and distributed cracks.**	Weak and soft	Takes a long time to harden. Each undercoat must be allowed to dry thoroughly before applying next coat.
Cement/sand		Strong and hard	Hardens fairly quickly. Undercoats as above. A workability aid helps application.
Cement/lime/sand 1:1:6		Sufficiently strong and hard for most purposes	Hardens slowly. Undercoats as above. Addition of lime gives easier working. Lightweight aggregates may replace sand.
1:2:9			
GYPSUM PLASTERS Neat gypsum plaster Class B	**All expand as they set and subsequent movements are small.**	Hard	Sets quickly. Allow to dry as soon as possible.
Class C		Harder	Sets slowly and so allows ample time for finishing to smooth surface. Do not allow to dry too quickly.
Class D		Hardest	ditto
Gypsum plaster/sand Class B	The addition of sand reduces expansion and subsequent movement	Strength falls off steeply with increase in sand content.	Lightweight aggregates such as expanded vermiculite or clay may replace sand.
Class C			
Gypsum plaster/lime/sand Class B	Lime reduces the expansion on setting.		**Addition of lime gives easier working.** Addition of lime accelerates set.
Class C			Normally used with lime for undercoats.

NOTE.—Glass A gypsum plaster (plaster of Paris) is not included. It sets very quickly and is used in small batches for repair work.

BACKGROUNDS

Backgrounds of brickwork or concrete

Walls—brick or concrete. The movement chiefly to be considered is the initial drying shrinkage. Materials vary widely in this respect; clay brickwork shrinks very little, lightweight concrete blockwork may shrink considerably. Both should be allowed to dry out before plastering but it is particularly important with the latter that the drying be as complete as possible if cracking or spalling of the plaster is to be avoided. If the wall shrinks, the nature of the plaster, whether it be of a type that shrinks or expands, will have but little effect on the incidence of cracking.

If a good mechanical key has not been provided during the building of the wall, measures must be taken to provide a key or to improve adhesion. With brick or blockwork the joints may be raked out and the bricks or blocks, if smooth, can be hacked. A thin spatterdash coating of 1:2 cement:coarse sand vigorously thrown on may give sufficient adhesion; the application of a bituminous material blinded with sand has sometimes proved successful; in bad cases it may be necessary to fix chicken wire or expanded metal

to the background. On very smooth surfaces, e.g. glazed tiling, the application of a bituminous material and sand or of one of the proprietary synthetic emulsions has shown some success.

Concrete cast against smooth formwork may give little or no key and failures of normal plaster coats on such a surface are common. If a chemical retarder has been applied to the formwork, a roughened surface can easily be formed by brushing. Hacking a hardened surface is difficult and expensive. A spatterdash coat may be applied as a base for normal plastering or special plasters such as a low expansion board plaster for single-coat work, or a concrete bonding plaster, may be used.

Concrete soffits. With an *in situ* concrete slab reinforced in both directions, drying shrinkage is restrained to some extent. In theory, a floor of precast concrete beams which can be matured and dried before being built in should be less troublesome than the cast *in situ* floor. In practice, the restriction of reinforcement to one direction (in some systems) and the risk of differential movement of adjacent beams under load may offset this advantage. Concrete roofs may suffer considerable thermal movements unless special precautions are taken; the movement shows up most at the corners of the building and special design treatment, as discussed on page 5, is valuable.

Good adhesion is imperative. If it is known that a concrete soffit is to be plastered, steps to ensure good adhesion should be taken during construction, as for concrete walls.

Lining materials

Boards and slabs are fixed dry and do not introduce any serious drying shrinkage risk. Some, such as fibreboard, have a relatively high moisture movement; they should preferably be stored for a day or two before installation in the room or building in which they are to be fixed. If, however, the building is subsequently centrally heated, or if there are large changes in humidity, moisture movement sufficient to cause cracking of the plaster may occur. In addition to their own moisture movement, lining materials will also be subjected to moisture movement in the timber framing to which they are fixed.

Most of the boards, slabs and lathing used as backgrounds for plaster are too weak or flexible to restrain slight movement in the plaster itself. Strong plasters that shrink on drying must be avoided, otherwise bowing of the background or cracking of the plaster may occur. Success in obtaining a crack-free surface will depend very much on the plaster remaining dimensionally stable after application. Where mixes that shrink on drying have to be used, time must be allowed for each coat to dry out and crack before the next is applied.

The treatment of joints in board and slab backgrounds is discussed separately on page 5.

Adhesion to wood or metal lathing is obviously good as long as the keys remain unbroken. The keys on timber lathing are often broken by vibration before they have fully hardened. Wood-wool provides a good key. Adhesion to gypsum plasterboard and insulating fibreboard is ensured by using the appropriate types of plaster. Cork may need a brush coating of cement slurry and the provision of wire mesh stapled on to give a satisfactory key.

Walls and partitions. Where the lining is fixed to battens fixed to a dry wall, movement of the lining and plaster only need be considered. On timber stud partitions the moisture movement of the timber must be added and will increase the risk of cracking of the plaster.

Ceilings. Both moisture and deflection movements may occur with timber joisted ceilings. Whether or not these movements cause cracking depends upon a number of factors, including the extent to which the joists are braced and the firmness with which the lining is fixed.

PLASTERING MATERIALS

Plastering materials range from the cement type that shrink strongly as they set and dry to the gypsum type that expand slightly on setting and subsequently shrink very little. It is sometimes possible so to adjust the ingredients of the latter so that there is very little dimensional change after application, as in "low setting-expansion quality" gypsum plasters.

The sand used in cement/lime mixes can have an important influence on shrinkage; much clayey or fine material makes for high shrinkage. It may also interfere with the setting of cement or gypsum plaster; on the other hand its absence makes for harshness and difficulty in application. If sands of uniform particle size are used in a cement/lime mix, the mix needs an excess of water and this may result in low strength and high shrinkage. Various lightweight aggregates are now being used in place of sand.

Plaster finishes may range from the hard, smooth surface given by Keene's to the soft absorbent surface of lime and sand. A mix that will shrink on drying is not suitable for a hard, smooth, trowelled finish.

Mixes based on cement or lime may take weeks to dry, particularly in cold, damp weather. The application of further coats before full drying and shrinkage has taken place is a frequent cause of subsequent cracking or spalling. The time available for completion and the period of the year in which the work is likely to be carried out should always be taken into account when cement or lime mixes are specified.

Plasters based on cement or lime stand up best to continued dampness; gypsum plasters must not be used in such conditions.

Table 1 sets out the characteristics of various plastering mixes from the present standpoint.

TABLE 2 BACKGROUNDS AND PLASTERS

Background	Drying Shrinkage	Condition of Surface	Key or Bond	Preparation of Surface	Appropriate plaster mixes		Remarks
					Undercoats	Finishing Coat	
Clay brickwork and blockwork	Negligible	Normal bricks, joints raked or bricks slotted	Good	None	Any mix, e.g. Weak—1:2:9 cement/lime/sand or gypsum plaster/lime/sand	Lime putty/gypsum plaster	Wall should be dry.
		Smooth bricks, joints flush	Poor	Rake and hack, spatterdash coat, bituminous coat and sand or fix wire mesh	Strong—1:1:6 cement/lime/sand or gypsum plaster/sand	Gypsum plaster neat, with sand or with sand and lime	Spatterdash coat, 1:2 or 3 cement: coarse sand should be allowed to harden before applying undercoat. Wire mesh should be fixed at least ¼ in. clear of surface.
Sand-lime or concrete brickwork	Low to high according to quality	Joints raked	Good	None	As for clay brickwork		
Dense concrete blockwork	ditto	Blocks usually smooth	Poor	Rake and hack, spatterdash coat or fix wire mesh	As for clay brickwork		Wall must be dry.
Lightweight concrete blockwork	High	Usually rough	Good	None	Weak, i.e. 1:2:9 cement: lime:sand or gypsum plaster/lime/sand	Lime putty/gypsum plaster	Or to block maker's instructions. Wall must be dry.
Concrete cast in situ	Low to high according to mix	Smooth from smooth plane formwork	Poor	Hacking or spatterdash (or use special plasters)	Class B gypsum—plaster/sand Cement/sand or cement/lime/sand on keyed surfaces only	Any gypsum plaster mix	If concrete bonding plaster is used as pretreatment it must be used neat.
		Scraped after use of retarder Cast indentations	Good	None		For single coat work a Class B gypsum plaster neat (Low setting expansion quality or concrete bonding plaster.)	
Gypsum plasterboard	(Fixed dry)	—	Adequate with suitable plasters	None	Class B gypsum plaster/sand	Any gypsum plaster mix	Lime must not be added to undercoats. Joints may be scrimmed, depending on background and conditions.
Insulating fibreboard	(Fixed dry, but moisture movement high)	—	ditto	None	None	Class B gypsum plaster neat (Low setting expansion quality)	Joints should be scrimmed unless fibreboard lath is used.
Wood and metal lath	—	—	Good	—	Weak—1:2:9 cement: lime:sand or gypsum plaster/lime/sand Strong—gypsum plaster/sand	Lime putty/gypsum plaster Any gypsum plaster mix	Hair, 9 lb. to cu. yd. should be added to undercoat.
Wood-wool	(Fixed dry, but moisture movement high)	Rough	Good	None	As for wood and metal lath		Joints should be scrimmed.
Cork (used mainly in cold stores, etc.)	—	Smooth	Poor	1:1 cement: fine sand brushed on and galv. wire mesh stapled on	Class B gypsum plaster/sand	Any gypsum plaster mix.	If the surface provides some mechanical key, the preparation described may not be needed.

DESIGN OF PLASTERWORK: GENERAL

It is now possible to consider background and plaster in relation to one another and to the key or adhesion between them. Table 2 sets out the various types of background, their liability to moisture movement and other characteristics affecting plastering, with the types of plasterwork likely to prove satisfactory.

When two or more coats of plaster are applied, *each undercoat should be regarded as a background for the following coat.* Cement and lime undercoats should be allowed to dry out before a further coat is applied, to avoid cumulative shrinkage stresses on the bond with the body of the wall. A strong coat should not be applied over a weaker one, which would be unable to restrain its movements.

DESIGN OF PLASTERWORK: SPECIAL FEATURES

Discontinuity in backgrounds

Cracking of walls or of plaster is often caused by discontinuity, for instance, changing from concrete to brickwork, from clay brickwork to lightweight concrete blockwork or even changing from one type of brick to another. Differential drying shrinakge is probably the main cause but difference in thermal movement may contribute. Reinforcement of the plaster by metal lathing or scrim over the junction is not always successful. The best treatment may be to cut through the plaster; the junction may be masked, if so desired, by fixing a cover strip to one side.

A change from wall to ceiling can be regarded as a discontinuity. Until a few years ago, it was treated with the respect it deserves and a cornice that would permit slight movement without cracking was introduced. Modern practice ignores the wall/ceiling junction in all but the more expensive buildings, with the result that cracks around the edge of the ceiling have to be made good at each re-decoration. If a cornice cannot be provided, the best treatment is again a straight cut through the plaster at the junction.

Treatment of joints in board and slab backgrounds

As one of the main functions of plasterwork is to provide an unbroken surface over the whole area of wall or ceiling, it is usually desired that all joints between board or slab backgrounds be completely hidden. The plaster coat bridging the joint is subject to higher stresses and any movement in the background will show at once by cracks along the joints. To avoid this the plaster is reinforced at the joints by fixing jute scrim or a suitable metal mesh. This treatment helps but the amount of movement that can take place without visible cracking is still limited. If large changes in humidity are expected in a building and it is desired to reduce the risk of plaster cracking to a minimum, thin board backgrounds that have a high moisture movement must be avoided.

Lightweight aggregates

The use of lightweight aggregates in place of sand in plaster is increasing. The reduction in weight gives easier handling and other properties of the lightweight plasters are useful in dealing with condensation.

In this country expanded vermiculite and expanded clay are being used, usually with Class B plasters, the former being available ready mixed with plaster. As the lightweight aggregate plasters can absorb more moisture than the sanded plasters and allow it to dry out again when conditions are favourable, they are useful in cases of intermittent condensation; the decorative finish must be permeable if this property is to be realised.

Backgrounds with warming panels

A plaster coat over warming panels is subject to abnormally severe thermal stresses and the temperature must not be too high; under dry conditions gypsum will decompose very slowly at 100°F. and fairly quickly at 125°F. Gypsum plaster with lime and sand is normally used. The first and second undercoats should consist of 1 lime putty to 3 sand with hair (9 lb. to 1 cu. yd.) incorporated; before use gypsum plaster is added in proportion 1 plaster to 2 lime/sand coarse stuff. The finishing coat should consist of 2 lime putty to 3 sand and, immediately before use, gypsum plaster is added in the same proportion as for undercoats. In some cases scrim, ½-inch mesh, should be applied over the whole area of the warming panels and at least 12 inches beyond and worked into the surface of the finishing coat so that the pattern remains just visible. A plastering specification has been prepared by, and copies may be obtained from, The Invisible Panel Warming Association, 136, Grand Buildings, Trafalgar Square, London, W.C.2.

The number of plastering coats

Until quite recently it was usual to apply plaster in three coats. The first was regarded as a levelling coat and the second was to give uniform suction so that the finishing coat could be satisfactorily applied to give a smooth surface. Today, three coats would be used only on wood or metal lathing or on a very rough, uneven background. Two-coat work is now usual on brickwork, blockwork and concrete; if the background is sufficiently level and has no extreme variations in suction there is little sacrifice in quality. It has been suggested that blockwork built with accurately made blocks to a true and fair face could be satisfactorily plastered with a single coat; attempts to do this have met with some success. Success is more likely if, (a) the

wall can be built with one fair face and that face only is to be plastered, (b) suction is moderate or can be easily adjusted and is similar for both units and the bedding mortar, (c) the plaster is given a textured surface or is finally covered with a substantial wallpaper. Class C or D plasters are probably better for this purpose than Class B as they harden more gradually.

It is possible to obtain a good finish with a single coat of plaster on gypsum plasterboard or insulating fibreboard provided the boards are fixed to give a true plane surface. The plaster must then be a Class B plaster of suitable type and should be the full 3/16-inch thickness required for single-coat work.

Wood-wool slabs require two coats.

STANDARDS AND CODES

This Digest makes no attempt to include all the details of composition and technique given in the British Standard Code of Practice, C.P.211 (1949), "Internal Plastering", nor in various British Standards and in several earlier Building Research Station and other publications. The more important of these sources, in addition to the Code mentioned, are as follows:—

Materials

Limes—B.S.890
B.R.S. Digest No. 46.
M.O.W. Advisory Leaflet No. 6.

Gypsum plasters—B.S.1191*
N.B.S. Bulletin No. 6.
M.O.W. Advisory Leaflet No. 2.

Cements—B.S.12 (Ordinary and Rapid Hardening)
„ 146 (Portland-blastfurnace)
„ 915 (High alumina)
B.R.S. Digest No. 27 (High alumina)

Sand—B.S.1198 (included with B.S.882 and others)
N.B.S. Bulletin No. 7
M.O.W. Advisory Leaflet No. 15.

Backgrounds and plastering

General—M.O.W. Advisory Leaflet No. 9
Wood laths—B.S.1317.
Metal lathing } B.S.1369.
Expanded metal } B.S.405.
B.R.S. Digest No. 14.
Gypsum plasterboard—B.S.1230.
M.O.W. Advisory Leaflet No. 21.
Insulating fibre board—B.S.1142.
B.R.S. Digest No. 10.
M.O.W. Advisory Leaflet Nos. 17 & 21.
Lightweight concrete blockwork—
B.R.S. Digest No. 52.

* B.S.1191 is entitled, "Gypsum and anhydrite plasters"; the only anhydrite plaster, marketed as "Pioneer", is no longer being produced.

CORRIGENDA

Digest No. 55—Drainage for housing

Page 1, col. 2. For first paragraph under "Sizes and gradients of soil drains" substitute:—

"The number of houses that may be connected to a 4-in. private sewer need not be less than four, and as many as twenty have been so connected satisfactorily. For more than twenty houses, the pipe should generally be increased to 6 in. diameter. The number of houses that may be drained by a 6-in. pipe will depend to a great extent on local conditions and it is not possible to give a definite limit".

Digest No. 67—Note on "Priming Keene's following the trowel"

Page 2, col. 1., third paragraph.

The reference to restriction of drying should apply only to anhydrous gypsum plasters. Insert at the beginning of the second sentence, "In the case of anhydrous gypsum-plasters"

(*Prepared by the Building Research Station, Garston, Watford, Herts.*)

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